

**The Texas Department of Transportation - Texas Transportation Institute  
Hydraulics and Erosion Control Laboratory**

**INTRODUCTION:**

Starting with the 1993 edition of the Texas Department of Transportation (TxDOT) *Standard Specifications for Construction of Highways, Streets and Bridges*, TxDOT shifted from a material-type specification into an “approved product”-type specification for two classifications of erosion control and revegetation products. These two product classifications included rolled and spray-on products promoted by industry for either slope protection or flexible channel liner applications, (termed “Soil Retention Blankets within TxDOT’s Standard Specification Item 169), and standard hydraulic mulches (termed “cellulose fiber mulch” within TxDOT’s Standard Construction Item 164).

TxDOT’s current specifications for soil retention blankets and for cellulose fiber mulches are included as attachments to this document, and do not include any of the typical ASTM-type material requirements such as mass per unit area, water holding capacity, tensile strength, elongation, pH, etc. TxDOT has elected to base their approved product list (APL) upon the documented field performance of the products through a formal evaluation program conducted by the Environmental Management Program of the Texas Transportation Institute (TTI).

TxDOT has defined the critical performance factors for the products, and has established minimum performance standards which must be met for any product seeking to be approved for use within any of TxDOT’s construction or maintenance activities.

With respect to the rolled and spray on products being promoted by industry for slope protection and flexible channel liner protection, TxDOT adopted the following critical performance factors:

- how well the product protected the seedbed of an embankment or a drainage channel from the loss of sediment during simulated rainfall or channel flow events; and
- how well the product promoted the establishment of warm-season, perennial vegetation.

Furthermore, TxDOT recognized that the above rolled and spray-on products are promoted by industry within two general use classifications including:

- products designed for overland flows associated with typical slope or embankment protection applications (termed “Class 1” applications within TxDOT’s Standard Specification Item 169), and
- products designed for concentrated water flows associated with typical highway drainage channels (termed “Class 2” applications within TxDOT’s Standard Specification Item 169).

With respect to standard hydraulic mulches being promoted by industry for typical revegetation applications, TxDOT did not feel that products should be expected to provide the same degree of surface-protection benefits as could be achieved by the Class 1 products, and adopted the following single critical performance factor:

- how well the product promoted the establishment of warm-season, perennial vegetation.

By statistically analyzing the performance data produced through controlled, field-performance tests, TxDOT is able to maintain discrete minimum performance standard for each classification of product evaluated at the TxDOT/TTI Hydraulics and Erosion Control Laboratory (Lab). In order for a product to be placed upon TxDOT’s APL, the product must meet (or exceed) all adopted minimum performance standards for that application. Failure to meet any of the adopted minimum performance standards will automatically reject the product from being placed on the APL.

## INTRODUCTION (cont.)

Due to budget constraints and to protect against weather related failures in the future, a review of the TxDOT testing program was conducted in 2000 in order to reduce the annual operating costs of the facility. Likewise, there was a desire to make the testing program more flexible so that the program can provide a better service to other agencies that have expressed interest in the potential for a cooperative program of testing and research. Following this review by TxDOT and TTI personnel, a new protocol was developed that will meet several objectives:

- Address, and to the degree possible, eliminate the criticisms of the existing testing methods.
- Improve on other testing methods proposed by industry and other sources.
- Ensure reproducibility of results.
- Design tests that make results regionally translatable.
- Reduce the testing and annual operational costs.
- Provide a quicker turn around of results.
- Remove the potential evaluation delays due to slope damage due to catastrophic weather events.

## THE TESTING FACILITY:

A new facility has been constructed to meet these program objectives and a new testing protocol has been put in place. The facility includes a building with two runoff beds and rainfall simulator to evaluate soil protection products. An outdoor flume will be used to evaluate channel liner products. Two greenhouses will be used to establish vegetation in trays and flumes before and during the testing cycle on a year-a-round basis. The facility has been constructed by the Environmental Management Program of The Texas Transportation Institute on Texas A&M University's Riverside Campus, located 6.5 km (4 miles) west of Bryan, Texas.



**Slope Protection Facility (under construction)**

The greenhouses at the facility allow vegetation to be grown on a year-a-round basis. One greenhouse contains the nursery flats covered with the selected slope protection products to determine their effect on establishing perennial vegetation cover. Flats used to determine the tenting characteristics of the selected products are also grown in this greenhouse.

The other greenhouse is used to grow vegetation in the flumes covered with selected channel liners prior to flow simulation.



**Greenhouses**

## **THE POOLED FUND ADVISORY COMMITTEE**

State transportation departments have the opportunity to participate in the facility by contributing to the pooled fund project. Participants in pooled fund project will have access to all performance data including ranking of products based on there sediment control and vegetation performance by class. Each participant will also be given the opportunity to have a representative on the Pooled Fund Advisory Committee. The committee, chaired by the TxDOT representative, has the responsibility of setting direction of research at the Laboratory. TTI input concerning laboratory will be make through the chairman.

## **THE INDUSTRY ADVISORY COUNCIL**

Both TxDOT and TTI recognize a need for a venue through which industry could make comments and suggestions regarding the evaluation program. The Industry Advisory Council (IAC) was formed to encourage dialogue between industry, participants, related associations and the TxDOT/TTI staff. IAC members call meetings at their convenience to discuss matters appropriate to the conduct of the Laboratory. TxDOT/TTI staff will be available to meet with the IAC to discuss and provide answers to questions or concerns raised by the IAC. Although TxDOT will remain sensitive to all matters voiced by the IAC, the final decision and authority regarding the conduct of the facility remains with TxDOT.

## **INITIAL EVALUATION FEES**

Effective with all products evaluated within the 2001 evaluation cycle and beyond, initial evaluation fees shall be required of each product evaluated at the TxDOT/TTI Hydraulics and Erosion Control Laboratory. These fees shall be above and beyond any fees as necessary for TTI to provide for the installation of the products.

The initial evaluation fee schedule shall be as follows:

- Class 1 “Slope Protection” Applications: \$3,400 per evaluation set
- Class 2 “Flexible Channel Liner” Applications: \$4,500 per individual channel (3 or 7% slope)
- “Cellulose Fiber Mulch” Applications: \$3,400 per evaluation set.

An “evaluation set” is defined as two individual evaluation plots – either a 2:1 clay and a 2:1 sand set, or a 3:1 clay and a 3:1 sand set. (Cellulose Fiber Mulch products are evaluated on 3:1 slopes only.)

Should initial evaluation fees not be received within TTI by the deadline established, the product will be removed from the evaluation waiting list schedule, and the evaluation slot offered to the next product in accordance with the existing procedures relating to the waiting list. The product must then submit a new “Request for Performance Evaluation” packet in order to place the product back on the waiting list for evaluation.

## RECERTIFICATION FEES & LABORATORY REPORT OPTIONS

The intent of the recertification program is to insure quality control of products once approved, and insure that no significant revisions have been made to the product's material characteristics, trade name, private label list, official contact representative, etc.

### Recertification Schedule:

Recertification fees and laboratory reports shall be required of each product on TxDOT's Approved Product List (APL) as follows:

#### Class 1 "Slope Protection" Application Products:

<b>If the Product was Originally Approved for Class 1 Applications During an Evaluation Cycle Ending In . . .</b>	<b>Then Initial Recertification / Recording Fees and Laboratory Reports are Due by the Last Working Day of November, of . . .</b>	<b>And Subsequent Recertification Recording Fees and Laboratory Reports are Due by the Last Working Day of November of . . .</b>
1991 or 1992	1999 <sup>1</sup>	2003, 2006, 2009, 2012, etc.
1994 or 1995	2000	2004, 2007, 2010, 2013, etc.
1996 or 1997	2001	2005, 2008, 2011 2014, etc.
1998 or 1999	2002	2006, 2009, 2012, 2015, etc.
2000	2003	2007, 2010, 2013, 2016 etc.
2001	2004	2008, 2011, 2014, 2017, etc.
2002	2005	2009, 2012, 2015, 2018, etc.
2003	2006	2010, 2013, 2016, 2019, etc.
2004	2007	2011, 2014, 2017, 2020, etc.
2005	2008	2012, 2015, 2018, 2021, etc.

#### Class 2 "Flexible Channel Liner" Application Products:

<b>If the Product was Originally Approved for Class 2 Applications During an Evaluation Cycle Ending In . . .</b>	<b>Then Initial Recertification / Recording Fees and Laboratory Reports are Due by the Last Working Day of November, of . . .</b>	<b>And Subsequent Recertification Recording Fees and Laboratory Reports are Due by the Last Working Day of November of . . .</b>
1995	1999 <sup>2</sup>	2003, 2006, 2009, 2012, etc.
1996	2000	2004, 2007, 2010, 2013, etc.
1997	2001	2005, 2008, 2011 2014, etc.
1998	2002	2006, 2009, 2012, 2015, etc.
1999	2003	2007, 2010, 2013, 2016 etc.
2000	2004	2008, 2011, 2014, 2017, etc.
2001	2005	2009, 2012, 2015, 2018, etc.
2002	2006	2010, 2013, 2016, 2019, etc.
2003	2007	2011, 2014, 2017, 2020, etc.
2004	2008	2012, 2015, 2018, 2021, etc.

<sup>1</sup> Deadline was Revised by TxDOT to October 4, 2001

<sup>2</sup> Deadline was Revised by TxDOT to October 4, 2001

## RECERTIFICATION FEES & LABORATORY REPORT OPTIONS ( cont.)

“Cellulose Fiber Mulch” Application Products:

<b>If the Product was Originally Approved for Mulch Applications During an Evaluation Cycle Ending In . . .</b>	<b>Then Initial Recertification / Recording Fees and Laboratory Reports are Due by the Last Working Day of November, of . . .</b>	<b>And Subsequent Recertification Recording Fees and Laboratory Reports are Due by the Last Working Day of November of . . .</b>
1992	1999 <sup>3</sup>	2003, 2006, 2009, 2012, etc.
1994 or 1995	2000	2004, 2007, 2010, 2013, etc.
1996 or 1997	2001	2005, 2008, 2011 2014, etc.
1998 or 1999	2002	2006, 2009, 2012, 2015, etc.
2000	2003	2007, 2010, 2013, 2016 etc.
2001	2004	2008, 2011, 2014, 2017, etc.
2002	2005	2009, 2012, 2015, 2018, etc.
2003	2006	2010, 2013, 2016, 2019, etc.
2004	2007	2011, 2014, 2017, 2020, etc.
2005	2008	2012, 2015, 2018, 2021, etc.

### Recertification Fees and Options:

Manufacturers of products on TxDOT’s APL have the following options regarding recertification of their products:

<b>Option</b>	<b>Procedures</b>	<b>Type of Product</b>	<b>Fee</b>
1	Manufacturer has required physical property tests performed by an independent, accredited laboratory of their choice. Tests shall have been performed within a three-month period prior to the submission for recertification. Laboratories must be accredited by either the Geosynthetic Accreditation Institute, Laboratory Accreditation Program (GAI-LAP), or the American Association for Laboratory Accreditation (A2LA)	Class 1	\$100
		Class 2	\$100
		Cellulose Fiber Mulch	\$100
2	Manufacturer submits a physical sample of product of product to the Texas Transportation Institute who will perform the appropriate physical property tests.	Rolled Class 1 or 2	\$650
		Spray-On Class 1	\$250
		Cellulose Fiber Mulch	\$250

<sup>3</sup> Deadline was Revised by TxDOT to October 4, 2001

### EVALUATION WAITING LIST:

Given the limited number of individual evaluation plots or channels, and given the numbers of products being developed and marketed by industry, it was necessary to implement a waiting-list procedure to provide the greatest degree of access to the facility to the greatest number of participants. The Laboratory Manager is required to maintain a waiting list of those products that desire to be evaluated during the next available test cycle. The final decision confirming whether a product will be tested at the Laboratory rests with the Laboratory Manager.

The waiting list shall be maintained based upon the postmarked date on an acceptable, complete “Request for Performance Evaluation” (RPE) as received within TTI. Personal memoranda, telephone calls, fax transmissions or individual letters to the Lab Manager will not be utilized to determine a product(s) position on the waiting list. Based upon space availability, the Laboratory Manager will offer an evaluation slot of the gradient and soil type requested by the participant for Slope Protection applications, or for the centerline gradient requested by Flexible Channel Liner participants, based upon the order of the postmarked date on the completed RPE. In the event a participant fails to commit to testing by the deadline established by TTI, the product will be removed from the waiting list and the evaluation slot offered to the next participant on the waiting list.

TxDOT reserves the right to limit the number of products any single company, manufacturer or distributor may evaluate during any given evaluation cycle, and will treat requests for different gradients, soil types and/or channel gradients as separate requests.

### INSTALLATION & EVALUATION PROCEDURES:

With respect to products being promoted for “Slope Protection” applications, participants must select the steepness of slope on which their product is to be evaluated. Participants have the option of having their product(s) evaluated on the 2:1 slopes only, the 3:1 slopes only, or on both 2:1 and 3:1 slopes.

With respect to products being tested for “Flexible Channel Liner” applications, participants have the option of specifying the shear-stress range most appropriate for their product. Generally, the 3% centerline-gradient channels are utilized to evaluate products designed for shear stresses up to 383 pascals (8 pounds per square foot).

All products, whether submitted for “Slope Protection” or for “Flexible Channel Liners” applications, are installed in strict accordance with the manufacturer’s published installation literature, as determined by the Laboratory Manager. Particular attention will be paid to edge and junction overlaps, staple size and staple pattern. Installation techniques which, in the Laboratory Manager’s opinion, is not supported by the product’s published installation literature, will not be permitted. The adopted installation techniques as taken from the product’s published installation literature and as agreed on between the participant and Laboratory Manager may be utilized by TxDOT to produce “Standard Installation Sheets” for the approved products as may be appropriate.

Currently, all hydraulic mulches are applied at the following rates only:

- Sandy Soils - 2.8 Mg/ha (2,500 lbs/ac); or
- Clay Soils - 2.3 Mg/ha (2,000 lbs/ac).

## INSTALLATION & EVALUATION PROCEDURES ( cont.)

To be approved for use by TxDOT a material must demonstrate the ability to foster the development of an acceptable vegetation cover and demonstrate that it can reduce the sediment loss to an acceptable level compared to an unprotected surface.

Each nursery flat and channel flume receive the identical rate of the standard, rural area, warm season, permanent, perennial seed mix as specified for TxDOT's Bryan District 17. Further, each flat and channel flume receive the same amount of fertilizer and simulated rainfall.

### Class I – SLOPE PROTECTION

The procedure for testing Class 1 slope protection materials utilizes two slopes, 2:1 and 3:1 and two soil types, sand and clay. At the participants option, a material may be tested on 2:1, 3:1 or both. Regardless of slope, the material is tested on both sand and clay. Materials are evaluated for sediment loss from three different storm intensities. Vegetation cover is determined by taking video samples which are processed to determine the average surface cover of vegetation.

In the new protocol, sediment loss is measured independently of vegetation. Removing the vegetation from the test will provide a better measure of a materials ability to protect the soil surface and prevent down hill migration of sediment and seed. The same soil for the sediment test will be used for the vegetation cover test. Soil (sand and clay) will be sterilized using steam. Soil will be placed on steam pipes laid on a concrete base. Soil will be covered and raised to a temperature of 140°F (60°C) for 6 hours. They will then be placed in the test beds and nursery flats within 48 hours of treatment.

### Test Beds

Test beds for sediment control tests will be 30 ft. x 5 ft. x 0.7 ft. deep. Frames are steel and plywood with porous bottoms. A layer of filter fabric will control loss of material from the beds over the bottom grid.

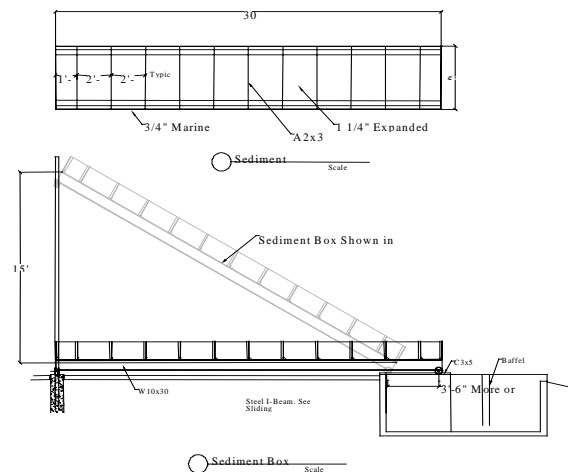
Soil used in the tests are of two types, a loamy sand and a plastic clay. The soils will be collected from on site sources, graded for texture composition and organic content to insure uniformity. Soil moisture is controlled for all tests.

Once the soil have been stabilized in the test beds the slope protection material will be applied according to manufacturer's literature.

### Sediment Collection and Processing

All water and sediment will be collected in a tank at the base of the sediment beds. The sediment will be allowed to settle for a minimum of 12 hours. At that point the clear water will be drawn off. The remaining sediment and water will be removed from the sediment tank and weighed. Weight will be taken to the nearest 0.1 lb. (.005 kg.). Sediment will then be agitated for two minutes and then 10 samples will be taken. Agitation will continue until all samples are taken. Samples will be transferred to a desiccating oven and dried at 130°F (58°) for 24 hours. Samples will be weighed on a scientific balance to the nearest 0.0004 oz. (0.01 g).

Sediment loss will be calculated by determining the water ( $w$ ) to sediment ( $s$ ) ratio ( $w/s$ ) of the sediment samples by dividing the dry sample weight by the original sample weight. This ratio will be applied to the full sediment sample to determine total sediment loss.



## INSTALLATION & EVALUATION PROCEDURES (cont.)

### Average Flow Velocity

At one minute into each test repetition, a dye will be injected at the top of the sediment box. The time it takes for the stained water to travel from the top of the tray to the bottom edge will be recorded. This data will be recorded as the average flow velocity of the material. *At this time,, this data will not be used in determining a pass or fail score for the material. However, there is some evidence that velocity of flow may be correlated to sediment transport. If so, this could be used at a later date to further simplify the evaluation of sediment transport.*

### Rainfall Simulation

Rainfall simulation will be done using a new simulator that more closely reproduces the more damaging precipitation drop sizes found in more intense storms. Uniformity of the coverage and precipitation rate will also be carefully controlled. Each test will consist of three (3), repetitions of three, 10-minute storms in the range of 4 to 7 in/hr. After each set of 3 rainfall events, the test bed will be completely rebuilt with new soil and new Class 1 material.

### Vegetation Cover

Vegetation cover will be based on the average percent of surface cover achieved in three standard nursery flats (12 in x 18 in) covered with the selected Class 1 material. Flats are seeded with the seeding mixture, placed on 3:1 and 2:1 racks and allow to grow for 90 days. Percent vegetation covered will be determined using a digital camera and processed using the current VCAP technology.

## CLASS II – FLEXIBLE CHANNEL LINERS

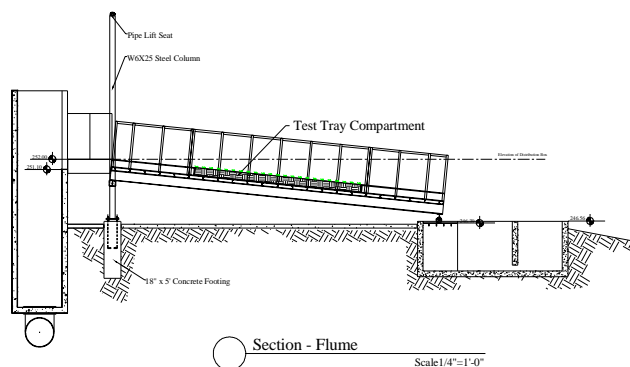
The procedure for testing Class II flexible channel liner material utilizes vegetated trays 30 ft long (9.1 m) x 1.5 ft wide (0.46 m) x 4.0 ft (1.2 m) deep which are placed in a flume prior to the simulated flow event. The flume slope can be adjusted from 0% to 12%. A material may be tested on a 7% or 3% slope depending on the manufacturers estimate of the materials working strength. Shear stress flows beginning at the 96 pascal (2 lb/sq ft) level and continuing on a 48 pascal (1 lb/sq ft) increments.

### Test Beds

Three test trays will be prepared for each material to be tested. Trays will be lined with a filter fabric and then filled with sterile soil. They will then be seeded manually and the channel liner will be installed. Material will be fastened at the top and bottom and in accordance with the manufacturer's published literature. Once prepared, the trays will be watered and placed in the greenhouse for the initial 90 day resting period. During the rest period water will be provided at the rate of 0.75 inch (19mm) per week.

### Flow Simulation

Flow simulation will begin after the 90-day rest period. Trays will be placed in the flume and brought to 75% field capacity. Test flows will then be run for 20 minutes. Two flows will be run on each tray successively at depths of 1 foot. After each increment of 1 foot, the material will be allowed to rest for a minimum of 48 hours and the test repeated at the next stress. Test will continue in this manner until the material fails or survives a stress of >6 psf.



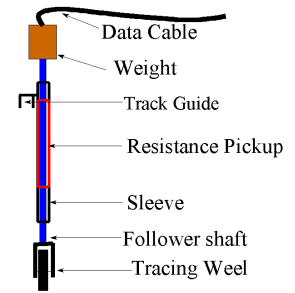


## INSTALLATION & EVALUATION PROCEDURES (cont.)

### Sediment Data Collection

After each run, profiles will be taken longitudinally. Two profiles 3 in (76mm) from each side of the flume and the third along the centerline on 6 in (152) increments are taken down the flume. This is accomplished with a computer operated instrument and the data is automatically recorded in a computer.

Sediment movement will be taken as a gross measure of sediment deposited and lost. A second calculation of sediment loss will be made using the average end area method from the longitudinal profiles.



Profile Instrument

### Vegetation Cover

Vegetation cover remains a consideration in channel liner performance. In a channel the material relies to some degree on having some vegetation to help stabilize the blanket. Therefore, it is important that the material protect the seed bed and protect the young plants until the channel is stabilized.

At the end of the 90 day growing period, trays will be checked for any foreign vegetation that could indicate that the product was contaminated with weed seed. If no weeds are present, trays will be placed on a camera stand and photographed. The photographs will be processed using the VCAP program to determine the percent of cover achieved. The data reported will be the arithmetic average of surface cover for the three sample trays for each soil type.

### CLASS III – HYDRAULIC MULCHES

Using the old protocol, hydraulic mulches were not subject to simulated rainfall events or evaluated for sediment loss. They were only evaluated on their ability to foster the growth of perennial vegetation. However, Cellulose Fiber Mulches are often used for slope protection on the more gentle (3:1) slopes.

Under the “new” protocol Cellulose Fiber Mulches will be tested for sediment loss and vegetation growth using the same criteria as Class I slope protection for 3:1 sand and clay soils.

### Test Beds

Soil used in the tests are of two types, a loamy sand and a plastic clay. The soils will be collected from on site sources, graded for texture composition and organic content to insure uniformity. All soils are sterilized by steam. Soil moisture is controlled for all tests.

Once the soil have been stabilized in the test beds the “cellulose fiber mulch” will be applied with commercial application equipment according to TxDOT’s guidelines:

- Sandy Soils - 2.8 Mg/ha (2,500 lbs/ac); or
- Clay Soils - 2.3 Mg/ha (2,000 lbs/ac).

## INSTALLATION & EVALUATION PROCEDURES (cont.)

### Sediment Collection and Processing

All water and sediment will be collected in a tank at the base of the sediment beds. The sediment will be allowed to settle for a minimum of 12 hours. At that point the clear water will be drawn off. The remaining sediment and water will be removed from the sediment tanks and weighed. Weight will be taken to the nearest 0.1 lb. (.005 kg.). Sediment will then be agitated for two minutes and then 10 samples will be taken. Agitation will continue until all samples are taken. Samples will be transferred to a desiccating oven and dried at 130°F (58°) for 24 hours. Samples will be weighed on a scientific balance to the nearest 0.0004 oz. (0.01 g).

Sediment loss will be calculated by determining the water (*w*) to sediment (*s*) ratio (*w/s*) of the sediment samples by dividing the dry sample weight by the original sample weight. This ratio will be applied to the full sediment sample to determine total sediment loss.

### Average Flow Velocity

At one minute into each test repetition, a dye will be injected at the top of the sediment box. The time it takes for the stained water to travel from the top of the tray to the bottom edge will be recorded. This data will be recorded as the average flow velocity of the material. *At this time, this data will not be used in determining a pass or fail score for the material. However, there is some evidence that velocity of flow may be correlated to sediment transport. If so, this could be used at a later date to further simplify the evaluation of sediment transport.*

### Rainfall Simulation

Rainfall simulation will be done using a new simulator that more closely reproduces the more damaging precipitation drop sizes found in more intense storms. Uniformity of the coverage and precipitation rate will also be carefully controlled. Each test will consist of three (3), repetitions of three, 10-minute storms in the range of 4 to 7 in/hr. After each set of 3 rainfall events the test bed will be completely rebuilt with new soil and new mulch application is made.

### Vegetation Cover

Vegetation cover will be based on the average percent of surface cover achieved in three standard nursery flats (12 in x 18 in) covered with the selected mulch material. Flats are seeded with the seeding mixture, placed on 3:1 and 2:1 racks and allow to grow for 90 days. Percent vegetation covered will be determined using a digital camera and processed using the current VCAP technology.

At the end of the 90 day growing period, trays will be checked for any foreign vegetation that could indicate that the product was contaminated with weed seed. If no weeds are present, trays will be placed on a camera stand and photographed. The photographs will be processed using the VCAP program to determine the percent of cover achieved. The data reported will be the arithmetic average of surface cover for the three sample trays for each soil type.

### **APPROVAL BY EXTENTION**

Within TxDOT, “Approved by Extension” shall apply for “Slope Protection” applications only. Approval by Extension shall not apply to “Flexible Channel Liner” applications or to Hydraulic Mulch applications.

For Slope Protection applications products, if the participant elects to evaluate a product on the severe slope conditions (2:1) only, and the product successfully meets the current minimum or maximum performance established by TxDOT, the product will also be included as a approved product on the less severe (3:1) conditions within the same soil texture group. For example, if a product is evaluated on the 2:1 clay and sand beds, and successfully meets the adopted sediment and vegetation density standards for 2:1 clay only, the product will also be listed as an approved product for the more gentle 3:1 clay beds.

If a product elects, however, to test on the more gentle 3:1 beds, the product will not be added to the more severe (2:1) beds as an approved equal regardless of the performance of the material. If a product elects to be tested on both 2:1 and 3:1 beds, the product’s individual performance, as documented within each application, shall determine placement upon TxDOT’s Approved Product List (APL) and approval by extension shall not apply.

### **RELEASE OF PRODUCT PERFORMANCE DATA:**

With the exception of the final research reports as published by the Texas Transportation Institute, all performance data will be released by TxDOT only. Performance data will be released only at the completion of an evaluation cycle, and all data, regardless of ranking, shall be published on all products by individual trade or brand name.

The Approved Product List for all products evaluated to date is available through TxDOT Internet Home Page without charge. TxDOT will maintain the latest complete performance data and the make it available only to those states that are participating in the pooled research fund.

### **REVISION OF MINIMUM PERFORMANCE STANDARDS**

Based upon statistical analysis of performance data as produced through the Lab, TxDOT reserves the right to revise the minimum performance standards. In the event that an individual products performance data no longer meet the revised minimum performance standards, the product representative will be notified in writing by TxDOT and provided the opportunity of retesting the identical product within the next available evaluation cycle as determined by the Lab Manager.

The product will remain on the APL pending the results of the retest. In the event that the product fails to meet any of the revised performance standards, the product will be removed from the APL during the next scheduled revision of the APL. In the event that the product’s performance meets the newly adopted minimum performance standards, the product will remain on the APL.

### **CONTRACTOR’S OPTION**

The APL will be maintained by TxDOT according to the classes and types as may be appropriate for the given products. It will be the Contractor’s option of using any product, provided that product is on the current APL for the class and type specified within the plans. Installation of the product will be in strict accordance with any standard installation detail sheets as may be issued by TxDOT, or in accordance with the manufacturer’s printed installation literature in the absence of standard installation detail sheets.

#### **PRIVATE LABELING:**

Within TxDOT, private labeling shall apply, and private labels will be added to the APL if the original manufacturer of the product evaluated at the Lab certifies, to TxDOT's satisfaction, that the private label brand is identical to the product tested and only distributed under other (private labels) brand names. Additions or revisions to the APL due to private label name changes will be made only during the normally scheduled revision of the APL.

#### **REQUIRED MANUFACTURER LITERATURE:**

A product will not be accepted for evaluation at the Lab, nor placed on the waiting list for future evaluation at the Lab unless the participant furnishes evidence that the product is currently being marketed under a discrete trade or brand name, and unless the product can demonstrate published installation literature.

All "Request for Performance Analysis" packets for products which do not include complete manufacturer's literature, or for products which are under development only, shall not be accepted for evaluation through the Lab.

#### **APPROVED PRODUCT LIST:**

Based upon the performance data collected through the Lab, TxDOT will establish and maintain a current approved product list (APL). A revised APL will be issued only after data analysis of a March through December evaluation cycle has been completed, and is normally issued during March or April of each year.

The current APL will be maintained on TxDOT's Internet Home Page, which may be located by pointing your browser to <http://www.dot.state.tx.us>. Once at TxDOT's Home Page, you may access the APL by clicking first on the "Business" section, then clicking on "Field Performance of Erosion Control Products." Alternatively, the report may be accessed through the "Search" facility, using the words "erosion control report" in the search dialogue box.

Copies of the current APL may also be secured through the Vegetation Management Section of the Maintenance Division, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, telephone (512)416-3091, fax (512)416-3044, e-Mail [pnorth@mailgw.dot.state.tx.us](mailto:pnorth@mailgw.dot.state.tx.us).

#### **PRODUCT BRAND OR TRADE NAME REVISIONS:**

The manufacturer of a product evaluated at the Lab shall notify TxDOT should any revisions to the trade or brand name for the product be made. The manufacturer must provide the revised trade or brand name for the product and must further certify, to TxDOT's satisfaction, that the action reflects a revision to the trade or brand name only, and that no material properties were revised. The manufacturer must also notify TxDOT if any brand or trade name revisions are made to any of the product's private labels.

All revisions to the APL necessitated by revisions to brand or trade names will occur only within the normally scheduled revision of the APL which is typically released during February or March of each year.

## **WORLD WIDE WEB**

This document, and the official Approved Product List, will be maintained on TxDOT's Internet Home Page at <http://www.dot.state.tx.us>, as noted above. Hard copies of the document are also available to interested parties at no charge.

TTI also maintains an extensive Internet Web presence on the Lab. You may access this site through the Environmental Management Program, at <http://tti.tamu.edu/inside/hdv/programs/aem/facilities/hecl/>.

## **SUMMARY:**

The TxDOT/TTI Hydraulics and Erosion Control Laboratory is a unique facility which provides TxDOT and the specifying community data on the performance of a product's ability to protect the natural environment through controlled, formal performance evaluations.

The Lab provides industry with a timely, uniform and fair method through which their products are evaluated for possible usage within TxDOT's construction and maintenance activities. The evaluation program seeks to establish and maintain the greatest number of individual products on the APL possible, provided those products have demonstrated their ability to meet adopted minimum performance standards for the appropriate use applications.

## **FUTURE DIRECTIONS:**

As the new protocol is installed and refined, TxDOT and TTI are planning to expand the research program to include analysis of runoff samples to test for contaminants, tenting evaluation, and laboratory methods to determine product longevity.

## **PROGRAM CONTACT PERSONNEL:**

To discuss or request information on TxDOT's overall evaluation program for erosion control products or secure a hard copy of this report, contact John Mason, Texas Department of Transportation, Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, phone (512)416-3081, fax (512)416-3044, or through e-Mail to [jmason@dot.state.tx.us](mailto:jmason@dot.state.tx.us).

To secure a "Request for Performance Evaluation" packet, to inquire about waiting list or evaluation schedules or to arrange a visit to the evaluation facility, contact Jett McFalls, Lab Manager, Texas Transportation Institute Environmental Management Program, Gib Gilchrist Building, Room 128, College Station, TX 77843-3135, phone (979)847-8709, fax (979)862-1759, or through Email to [j-mcfalls@ttimail.tamu.edu](mailto:j-mcfalls@ttimail.tamu.edu).

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
Record of Products Tested and Listing of Private Labels

	Brand Name	Manufacturer or Distributor	Tested As	Private Label Names
1	<i>Agri-Fiber [99]</i>	Greenstone Industries, 3264 Villa Lane, Napa, CA 94558; 707-256-0715	Mulch	None
2	<i>Airtrol®</i>	U.S. Gypsum Co., 700 North Highway 45, Libertyville, IL 60048-1296; (708)970-5138	Slope	None
3	<i>Airtrol® Plus</i>	U.S. Gypsum Co., 700 North Highway 45, Libertyville, IL 60048-1296; (708)970-5138	Slope	None
4	<i>American Fiber Mulch</i>	American Fiber Manufacturing Inc., 1701 Bench Mark Drive, Austin, TX 78728; (512)251-3401	Mulch	None
5	<i>American Fiber Mulch (with Fiber-Plus)</i>	American Fiber Manufacturing Inc., 1701 Bench Mark Drive, Austin, TX 78728; (512)251-3401	Mulch	None
6	<i>American Fiber Mulch (with Hydro-Stik)</i>	American Fiber Manufacturing Inc., 1701 Bench Mark Drive, Austin, TX 78728; (512)251-3401	Mulch	None
7	<i>Anti-Wash®/Geojute®</i>	Belton Industries, Inc., 8613 Roswell Road, Atlanta, GA, 30350; (800)225-4099	Slope	Soil Saver
8	<i>BioD-Mat™ 90</i>	RoLanka International, Inc., 6476 Mill Court, Morrow, GA 30260; (800)760-3215	Channel	None
9	<i>BioD-Mesh™ 60</i>	RoLanka International, Inc., 6476 Mill Court, Morrow, GA 30260; (800)760-3215	Slope	None
10	<i>Conwed 3000 Bonded Fiber Matrix [99]</i>	Conwed Fibers, 1002 Buck's Industrial Dr., Statesville, NC 28677; 303-933-7770	Slope	None
11	<i>Conwed® Hydro Mulch®</i>	Conwed Fibers, 1 <sup>st</sup> Plaza, Suite 350, 1985 Tabe Blvd., SE, Hickory, NC 28601; (704)327-6670	Mulch	None
12	<i>Curlex® I</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011; (800) 777-2691	Slope	None
13	<i>Curlex® II (Double Sided)</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011; (800) 777-2691	Channel	None
14	<i>Curlex® II (Stitched)</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011, (800) 777-2691	Channel	None
15	<i>Curlex® III (Stitched)</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011; (800) 777-2691	Channel	None
16	<i>Curlex® Channel Enforcer I</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011; (800) 777-2691	Channel	None

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
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	Brand Name	Manufacturer or Distributor	Tested As	Private Label Names
17	<i>Curlex®-LT</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011; (800) 777-2691	Channel	None
18	<i>EarthBound [99]</i>	Earth Chem, Inc., PO Box 272627, Fort Collins, -CO 80527; 1-800-764-5726	Slope	None
19	<i>Earth-Lock</i>	Erosion Control Systems, Inc., 1800 McFarland Blvd., Suite 180, Tuscaloosa, AL 35406; (800)943-1986	Channel	1. Enkamat® Earthlock
20	<i>Earth-Lock II</i>	Erosion Control Systems, Inc., 9015 Energy Lane, Northport, AL 35476; 205-333-3080	Channel	None
21	<i>EcoAegis™</i>	Canadian Forest Products, Panel and Fibre Division, 430 Canfor Avenue, New Westminster, B.C., Canada V3L 5G2 (800)363-8873	Slope	None
22	<i>Econo-Jute [99]</i>	Belton Industries, 8613 Roswell Rd., Atlanta, GA 30350; 1-800-225-4099	Slope	None
23	<i>ECS High Impact Excelsior</i>	Erosion Control Systems, Inc., 9015 Energy Lane, Northport, AL 35476-6542; (800)942-1986	Channel	None
24	<i>ECS High Velocity Straw Mat</i>	Erosion Control Systems, Inc., 9015 Energy Lane, Northport, AL 35476-6542; (800)942-1986	Slope	None
25	<i>ECS Standard Excelsior</i>	Erosion Control Systems, Inc., 9015 Energy Lane, Northport, AL 35476-6542; (800)942-1986	Slope Channel	None
26	<i>ECS Standard Straw</i>	Erosion Control Systems, Inc., 9015 Energy Lane, Northport, AL 35476-6542; (800)942-1986	Slope	None
27	<i>Enkamat Composite 30 [99]</i>	Colbond Geosynthetics, PO Box 1057, Enka, NC 28728; 828-665-5023	Channel	None
28	<i>Enkamat Composite NPK</i>	Colbond Geosynthetics, PO Box 1057, Enka NC 28728, (828)665-5023	Channel	None
29	<i>Enkamat® 7018</i>	AKZO/NOBEL, PO Box 7249, Asheville, NC 28802; (704)665-5050	Channel	None
30	<i>Enkamat® 7020</i>	AKZO/NOBEL, PO Box 7249, Asheville, NC 28802; (704)665-5050	Channel	None
31	<i>Enviro-Gro</i>	Southwest Environmental Services, Inc., PO Box 134, Tyler, TX 75710; (903)531-2312	Mulch	None
32	<i>EnviroGuard Plus [98][99]</i>	Tascon, Inc., PO Box 41846, Houston, TX 77241; (800)937-1774	Slope	None
33	<i>Evercycle™ Hydro-Mulch</i>	Evergreen Global Resources, Inc., P.O. Box 130189, Tyler, TX 75713;	Mulch	None
34	<i>Excel® Fibermulch II with Exac-Tac™</i>	American Excelsior Company, 900 Avenue H East, PO Box 5624, Arlington, TX 76011; (800) 777-2691	Mulch	None

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
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	Brand Name	Manufacturer or Distributor	Tested As	Private Label Names
35	<i>FORMULA 480 Liquid Clay</i>	Enviro Group, Inc., 290 Noble Street, Suite A, Greenwood, IN 46142; (317)882-9369	Slope	None
36	<i>Futerra®</i>	Conwed Fibers, 1002 Bucks Industrial Park, Statesville, NC 28677; (704)871-8500	Slope	None
37	<i>GEOCOIR®/DeKoWe® 700</i>	Belton Industries, Inc., 8613 Roswell Rd., Atlanta, GA, 30350; (800)225-4099	Slope	None
38	<i>Geogro</i>	US Gypsum Corporation, 700 North Highway 45, Libertyville, IL 60048; (847)970-5138	Slope	None
39	<i>Geojute® Plus</i>	Belton Industries, Inc., 8613 Roswell Rd., Atlanta, GA, 30350; (800)225-4099	Slope	None
40	<i>Geojute® Plus 1</i>	Belton Industries, Inc., 8613 Roswell Rd., Atlanta, GA, 30350; (800)225-4099	Slope	None
41	<i>Geojute® Plus Regular High Velocity</i>	Belton Industries, Inc., 8613 Roswell Rd., Atlanta, GA, 30350; (800)225-4099	Slope	None
42	<i>Grass Mat</i>	Kenaf Marketing, Inc., 11690 Indian Hill Rd., Amarillo, TX 79124-2374; (806)353-7265	Channel Slope	None
43	<i>Greenfix CFO72RP</i>	Greenfix America, 604 East Mead Rd., Brawley, CA 92227; 760-348-7600	Channel	1. Enkamat Composite P/T
44	<i>Greenfix CF072RR</i>	Greenfix America, 604 East Mead Rd., Brawley, CA 92227, 760-348-7600	Channel	None
45	<i>Greenfix WSO72 [99]</i>	Greenfix America, 604 East Mead Rd., Brawley, CA 92227; 760-344-6700	Slope	None
46	<i>GREENSTREAK® PEC-MAT™</i>	Greenstreak, Inc., 3400 Tree Court Ind. Blvd., St. Louis, MO 63122; (800)325-9504	Slope Channel	None
47	<i>K-MAT</i>	Oklahoma Wood Fibers, 3 NW Texas Street, Idabel, OK (580)286-4363	Slope	None
48	<i>Koirmat™ 400</i>	Nedia Enterprises, 89-66 217 <sup>th</sup> St., Jamaica, NY 11427; (718)740-5171	Channel	None
49	<i>KoirMat™ 700</i>	Nedia Enterprises, 89-66 217 <sup>th</sup> St., Jamaica, NY 11427; (718)740-5171	Channel	None
50	<i>KoirMat™ 740</i>	Nedia Enterprises, 89-66 217 <sup>th</sup> St., Jamaica, NY 11427; (718)740-5171	Slope	None
51	<i>Landlok BonTerra CS2 [99]</i>	Synthetic Industries, Inc., 4019 Industry Drive, Chattanooga, TN 37416; 1-800-621-0444	Slope	1. Contech Straw/Coconut Fiber Mat 2. GeoTech environmental Systems TechMat SC
52	<i>Landlok BonTerra C2</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Channel	None
53	<i>Landlok BonTerra EcoNet ENCS2</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Slope	1. Straw/Coco-nut Fiber Mat w/ Kraft



TxDOT/TTI Hydraulics & Erosion Control Laboratory  
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Brand Name		Manufacturer or Distributor	Tested As	Private Label Names
				Net 2. TechMat™ SCKN
54	<i>Landlok BonTerra S1</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Slope	None
55	<i>Landlok BonTerra® S2™</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Slope	None
56	<i>Landlok BonTerra® SFB™</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Channel	None
57	<i>Landlok BonTerra® SFB12™</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Channel	Tensar TB1000
58	<i>Landlok BonTerra EcoNet ENS2</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444, Inc., 355 West Chestnut Street, Genesee, ID 83832; (800)285-0701	Slope	None
59	<i>Landlok BonTerra® CP2</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Channel	1. Coconut/Pol y Fiber Mat 2. TechMat™ CP 3-D
60	<i>Landlok BonTerra® EcoNet™ ENC2[98]</i>	Synthetic Industries / BonTerra, 4019 Industry Drive, Chattanooga, TN 37416; (423)899-0444,	Channel	3. Coconut mat w/Kraft Net 4. TechMat™ CKN
61	<i>Landlok 407GT</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 37416; (800)621-0444	Slope	1. Contech C-Jute 2. TerraJute
62	<i>Landlok FRS 3112</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 37416; (800)621-0444	Slope	None
63	<i>Landlok TRM 435</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 37416; (800)621-0444	Slope Channel	1. Contech C-35 2. Maccaferri MX287 3. Webtec Terraguard 44P
64	<i>Landlok TRM 450</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 37416; (800)621-0444	Channel	1. Contech TRM C-45 2. Webtec Terraguard 45P
65	<i>Landlok TRM 1050</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 37416; 1-800-621-0444	Channel	None

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
Record of Products Tested and Listing of Private Labels

	<b>Brand Name</b>	<b>Manufacturer or Distributor</b>	<b>Tested As</b>	<b>Private Label Names</b>
66	<i>Landlok TRM 1060</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 37416, (800)621-0444	Channel	None
67	<i>Lay-Low Mulch</i>	Oklahoma Wood Fibers, Inc., P.O. Box 761, Idabel, OK 74745; (580-286-4363	Mulch	None
68	<i>Miramat® 1000</i>	Nicolon Mirafi Group, 3500 parkway Ln., Suite 500, Norcross, GA 30092; (404)447-6272	Slope	None
69	<i>Miramat® TM8™</i>	Nicolon Mirafi Group, 3500 parkway Ln., Suite 500, Norcross, GA 30092; (404)447-6272	Channel	None
70	<i>Multimat 100 [99]</i>	Tenax Corporation, 4800 East Monument St., Baltimore, MD 21205; 410-522-7000	Channel	None
71	<i>North American Green C125 BN [99]</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711, (800)772-2040	Channel	None
72	<i>North American Green C350™ Three Phase™</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Channel	None
73	<i>North American Green P350</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Channel	None
74	<i>North American Green S150</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Slope Channel	None
75	<i>North American Green S150BN</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Slope	None
76	<i>North American Green S75</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Slope	None
77	<i>North American Green S75 BN</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Slope	None
78	<i>North American Green SC 150 BN [99]</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Channel	None
79	<i>North American Green SC150</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Slope	None
80	<i>North American Green S350</i>	North American Green, Inc., 14649 Highway 41 North, Evansville, IN 47711; (800)772-2040	Channel	None
81	<i>Oasis Fiber-Mulch [99]</i>	International Cellulose Corporation, 12315 Robin Road, Houston, TX 77045; 713-433-6701	Mulch	None

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
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	Brand Name	Manufacturer or Distributor	Tested As	Private Label Names
82	<i>PennzSuppress®</i>	Pennzoil Products Company, PO Box 2967, Houston, TX 77252-2967; 713-456-6126	Slope Mulch	None
83	<i>Permamat 150F</i>	Western Excelsior, PO Box 659, Mancos, CO 81328, (623)435-1741	Channel	None
84	<i>Permamat 200F</i>	Western Excelsior, PO Box 659, Mancos, CO 81328, (623)435-1741	Channel	None
85	<i>POZ-O-CAP®</i>	Chemical Lime Company, PO Box 121874, Fort Worth, TX 76107; (800)365-6724	Slope	None
86	<i>Pro Mat®</i>	Tascon, Inc. 7607 Fairview, Houston, TX 77041; (713)937-0900	Mulch	None
87	<i>Pro Mat® (with Airtak)</i>	Tascon, Inc. 7607 Fairview, Houston, TX 77041; (713)937-0900	Mulch	None
88	<i>Pro Mat® XL</i>	Tascon, Inc. 7607 Fairview, Houston, TX 77041; (713)937-0900	Mulch	None
89	<i>Pyramat®</i>	Synthetic Industries, Inc., 4019 Industry Dr., Chattanooga, TN 75230; (800)621-0444	Channel	None
90	<i>Second Nature® Recycled Paper Fiber</i>	Central Fiber Corporation, 4815 Fiber Lane, Wellsville, KS 66092; (800)654-6117	Mulch	None
91	<i>Seed-Guard™</i>	Belton Industries, 8613 Roswell Rd., Atlanta, GA 30350; (404)587-0257	Slope	None
	<i>Mat-Fiber Plus®</i>	Mat, Inc. 12402 Highway 2 Floodwood, MN 55736, (888)477-3028	Mulch	None
93	<i>Soil Guard™</i>	Mat, Inc., 12402 Highway 2 Floodwood, MN 55736, (888)477-3028	Slope	None
94	<i>SuperGro™</i>	AMOCO Fabrics and Fibers, 260 The Bluffs, Austell, GA 30001; (770)944-4419	Slope	None
95	<i>Tensar® Erosion Blanket TB1000 *** NO LONGER MANUFACTURED ***</i>	The Tensar Corporation, 1210 Citizens Pkwy, Morrow, GA 30260; (404)250-1290	Channel	LANDLOK® BonTerra SFB12 (orig manuf)
96	<i>Tensar® Erosion mat TM3000 *** NO LONGER MANUFACTURED***</i>	The Tensar Corporation, 1210 Citizens Pkwy, Morrow, GA 30260; (404)250-1290	Channel	None
	<i>Terra-Control®</i>	Acumen International, PO Box 41303, Houston, TX 77241; (713)896-0050	Slope	None
99	<i>verdyol® ERO-MAT®</i>	Verdyol Alabama, Inc., PO Box 605, Pell City, AL 35125; (205)338-4411	Slope	None
100	<i>verdyol® Excelsior High Velocity</i>	Verdyol Alabama, Inc., PO Box 605, Pell City, AL 35125; (205)338-4411	Slope Channel	None
101	<i>verdyol® Excelsior Standard</i>	Verdyol Alabama, Inc., PO Box 605, Pell City, AL 35125; (205)338-4411	Slope	1. Winters Excelsior Inc. "Poplar Excelsior Blanket"
102	<i>Xcel PP-5</i>	Western Excelsior, PO Box 659, Mancos, CO 81328, (623)435-1741	Channel	1. None
103	<i>Xcel Regular</i>	Western Excelsior, PO Box 659, Mancos, CO 81328, (623)435-1741	Slope	2. Contech Standard

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Brand Name		Manufacturer or Distributor	Tested As	Private Label Names
				3. Green Triangle Regular
104	<i>Xcel Superior</i>	Western Excelsior, PO Box 659, Mancos, CO 81328, (623)435-1741	Slope	4. Contech Standard Plus 5. Green Triangle Superior
	<i>Last</i>			

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
Record of Products Tested and Listing of Private Labels

**RECORD OF INDUSTRY REVISIONS TO PRODUCT BRAND OR TRADE NAMES**

Current As of: May 16, 2001

The following table documents revisions to product brand or trade names as made by the manufacturer / distributor, on products evaluated through the TxDOT/TTI Hydraulics and Erosion Control Laboratory:

<b>Brand / Trade Name as Originally Evaluated</b>	<b>Manufactured By</b>	<b>Revised Brand or Trade Name</b>	<b>Announced During</b>
<i>Curlex™</i>	American Excelsior Co.	<i>Curlex® I</i>	Oct 1995
<i>LANDLOK®® ECRM 450</i>	Synthetic Industries, Inc.	<i>LANDLOK®® TRM 450</i>	1996
<i>POLYJUTE® 407GT</i>	Synthetic Industries, Inc.	<i>LANDLOK®® 407GT</i>	1996
<i>LANDSTRAND® Natural</i>	Synthetic Industries, Inc.	<i>LANDLOK®® FRS 3112</i>	1996
<i>PennzSuppress® D</i>	Pennzoil Products Co.	<i>PennzSuppress</i>	January, 1999
<i>Curlex®-PCLE 1</i>	American Excelsior Co.	<i>Curlex® Channel Enforcer I</i>	January, 1999
<i>Curlex® PCLE 2</i>	American Excelsior Co.	<i>Curlex® Channel Enforcer II</i>	January, 1999
<i>(Any BonTerra) Product</i>	Originally Manufactured by BonTerra America, Inc., is now Manufactured by Synthetic Industries, Inc.	<i>(Added LANDLOK®) to the Existing BonTerra name</i>	March, 2000
<i>Curlex Heavy Duty 1.25, II Stitched</i>	American Excelsior Co.	<i>Curlex III, Stitched</i>	May 15, 2001
<i>Curlex Extra Doublenet</i>	American Excelsior Co.	<i>Curlex II, Stitched</i>	May 15, 2001
<i>Any PPS Packaging Co. Product</i>	PPS Packaging Company	In a conservation on May 15, 2001, between Paul Northcutt, MNT and Blake Mitchell, Western Excelsior Co, Mr. Mitchell advised that Western Excelsior will now manufacturer and distribute all products originally manufactured by PPS Packaging. All brand names and material specifications will remain identical to those shown by PPS Packaging Co.	May 15, 2001

TxDOT/TTI Hydraulics & Erosion Control Laboratory  
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**PRODUCTS NO LONGER BEING MANUFACTURED**

The following table documents those products which are no longer being manufactured:

Product Name	Evaluated As:	Comments
<i>Tensar® Erosion Blanket TB1000</i>	Class 1 & 2	By letter of 1/28/00, Tensar Earth Technologies, Inc., (Robert B. Anderson, P.E., Manager Technology Development) advised that these products are no longer being manufactured.
<i>Tensar® Erosion mat TM3000</i>		
<i>Enkamat Composite NPK</i> <i>Enkamat Composite P/T</i>	Class 2	In telephone conversation on May 15, 2001, between Kurt Chirbas, Colbond Geosynthetics, and Paul Northcutt, TxDOT, Mr. Chirbas advised that these products were no longer being manufactured.
<i>Greenfix CFO 72RP</i>	Class 2	In telephone conversation on May 16, 2001 between Bill Agnew, Reveg Environmental Consulting, and Paul Northcutt, MNT, Mr. Agnew confirmed that this product was no longer being manufactured.

## General Product Material Descriptions

*Disclaimer: The product descriptions shown within this table are general in nature, intended for overall product comparison purposes only, and are not to be used for specification purposes. Refer to individual manufacturer's literature for complete product material specifications for specific product brand or trade names.*

Brand Name of Product		Tested As	Material Description
1	<i>Agri-Fiber</i>	Mulch	Recycled Fiber Mulch manufactured entirely from recycled fibers. No trees or other virgin pulp are sacrificed in the process. Water holding capacity 1200 Grams (90% min); Moisture Content $12.0 \pm 3\%$ ; Organic Matter $98 \pm 2\%$ ; Ash content Approx 1.5%; Packaged in 50 lb bags net.
2	<i>Airtrol®</i>	Slope	A cementitious plaster binder produced from high-purity gypsum and applied in conjunction with an approved cellulose fiber mulch through a hydraulic process. The plaster is nontoxic, noncombustible, and harmless to fish, birds, plants and animals.
3	<i>Airtrol ® Plus</i>	Slope	A cementitious plaster binder produced from high-purity gypsum and applied in conjunction with an approved cellulose fiber mulch through a hydraulic process. The plaster is nontoxic, noncombustible, and harmless to fish, birds, plants and animals. <i>Tackifibers</i> , as produced by Synthetic Industries, Inc., is added to the plaster binder.
4	<i>American Fiber Mulch</i>	Mulch	Hydraulic mulch produced from recycled paper. No published literature available.
5	<i>American Fiber Mulch (with Fiber Plus)</i>	Mulch	Hydraulic mulch produced from recycled paper. No published literature available. <i>Fiber-Plus</i> is a specially coated synthetic fiber tackifier with long fiber length, as available through the Finn Corporation.
6	<i>American Fiber Mulch (with Hydro-Stick)</i>	Mulch	Hydraulic mulch produced from recycled paper. No published literature available. - <i>Hydro Stick</i> is a special gum-based tackifier as available through the Finn Corporation.
7	<i>Anti-Wash®/Geojute®</i>	Slope	Heavy jute mesh of undyed, unbleached yarn. Yarn count: warp - 78 per width min; weft - 42 per linear yard, min; Typical weight = 0.92 lbs/sq yd. Typical roll width = 48 inches.
8	<i>BioD-Mat™ 90</i>	Channel	Woven bristle coir blankets. Typical weight = 29 oz/sq yd; Typical wide width dry tensile strength = 159 lbs/in; Typical elongation at failure dry % 33; open area = 38; Typical thickness = 0.35 inch.
9	<i>BioD-Mesh™ 60</i>	Slope	Spun mattress coir yarns, 100% natural. Typical weight = 18 oz/sy; Typical wet tensile strength = 340x310 lbs/feet; Typical dry tensile strength = 525 x 473 lbs/feet; Typical limiting shear stress bare soil = 3.6 lbs/ft <sup>2</sup> .
10	<i>Conwed 3000 Bonded Fiber Matrix [99]</i>	Slope	Hydraulically applied, fiber mulch system comprised of long strand, thermally defibrated wood fibers ( $\pm 90\%$ by weight), bound together by a high strength polysaccharide polymer adhesive ( $\pm 10\%$ by weight). Wood fibers are thermo-mechanically defibrated from clean whole wood chips, containing a minimum of 25% of the fibers averaging 10mm long, with a minimum of 50% or more retained on a #24 mesh screen. Organic bonding tackifiers are of a high viscosity colloidal polysaccharide tackifier (4000 cps min) with activating agents.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
11	<i>Conwed® Hydro Mulch®</i>	Mulch	Wood fiber mulch consisting of virgin wood fibers manufactured expressly from whole wood chips and not produced from recycled materials such as sawdust, paper, cardboard, or residue from pulp and paper plants. Typical bag weight = 100 lbs; typical moisture content = 10% ± 3%; typical ash content 0.8% ± 0.2% OD basis.
12	<i>Curlex® I</i>	Slope Channel	Machined mat of curled wood excelsior of 80%, six-inch or longer fibers. The top of each blanket is covered with a photodegradable extruded plastic mesh. Typical weight = 0.975 lbs/sq yd; typical roll width - 48 or 96 inches; typical roll length = 90 feet.
13	<i>Curlex® II (Double Sided)</i>	Channel	Wood-machined mat of curled wood excelsior of 80%, six-inch or longer fibers. Both the top and the bottom of the blanket is covered with a photodegradable, extruded plastic mesh. Typical weight = 1.0 lb/sq yd; typical roll length = 112.5 feet or 180 feet; typical roll width = 4 feet.
14	<i>Curlex® II Stitched</i>	Channel	Natural excelsior blanket of 100% Great Lakes Aspen with curled, interlocking fibers with barbed edges. 80% of the fibers are a minimum of 6 inches. Net material is polypropylene with green or white UV degrader additive. Net openings are ¾" x 1 5/8".
15	<i>Curlex® III Stitched</i>	Channel	Natural excelsior blanket made of 100% Great Lakes Aspen with curled interlocking fibers with barbed edges. Top and bottom are covered with heavy duty black polypropylene netting with ¾"x3/4" openings. Weight: 1.25 lbs./SY. Water absorption ' 250%. Will remain on the soil for a minimum of 3 years.
16	<i>Curlex® Channel Enforcer I</i>	Channel	Natural, excelsior blanket made of 100% aspen excelsior, covered on the top and bottom sides with a polypropylene netting with approximate ¾" x ¾" openings Typical weight = 1.25 lbs/SY; typical roll width = 4 & 8 feet; typical roll length = 100 & 50 feet.
17	<i>Curlex®-Channel Enforcer II</i>	Channel	Natural, excelsior blanket of 100% aspen excelsior, 80% of fibers a minimum of 6" long with polypropylene - black netting on the top side and heavy-duty black netting on the bottom. Typical widths = 4 and 8 feet; typical lengths = 100 and 50 feet; typical weight = 55.5 lbs.
18	<i>Curlex®-LT</i>	Slope	Natural, excelsior blanket made of 100% virgin aspen excelsior, covered on the top and bottom sides with polypropylene netting with approximate ¾" x 1-5/8" openings. Typical weight = 0.64 lbs/sq yd; typical roll width = 8 feet; typical roll length = 90 feet.
19	<i>EarthBound [99]</i>	Slope	An anionic polyacrylamide erosion control agent and mulch tackifier designed to bind fine soil particles to soil.. Product is available in 5-lb and 35-lb containers.
20	<i>Earth-Lock</i>	Channel	Machine-produced mat of curled wood excelsior of 80%, 9 inches or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the mat. The excelsior shall be stitched to the plastic mesh and geogrid on a minimum of three inch centers with synthetic yarn. Typical roll weight = 75 lbs ± 10%; typical roll width = 7.5 feet; typical roll width = 6.5 feet.



General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
21	<i>Earth-Lock II [99]</i>	Channel	Machine produced mat of curled wood excelsior of 80%, 9 inches or longer fiber length with consistent thickness and the fiber evenly distributed over the entire area of the mat. The bottom side of the mat shall be a high strength nylon geomatrix. The curled wood excelsior is stitched to reinforced netting and a high strength geomatrix on 1 ½" centers with synthetic yarn. Roll width 6.35 ft; roll length 120 ft; weight per roll – 103 lbs ±10%; volume per roll – 84 Sq yds; mesh – ¾ " x ¾" one side; high strength nylon geomatrix – one side.
22	<i>EcoAegis™</i>	Slope	Bonded Fiber Matrix composed of proprietary blend of materials that work in combination to bond wood fibers into a durable matrix. Composition is refined wood fiber (90% by weight) and blended hydrocolloid-based binder (10%) by weight, natural in color, designed to be applied through conventional hydraulic seeding equipment with mechanical agitation.
23	<i>Econo-Jute[99]</i>	Slope	100% biodegradable erosion control fabric woven from 100% jute yarns. Weight per roll – 56 lbs. Roll size – 4' x 225'; roll coverage – 100 sq yds; Open area – 50-60%.
24	<i>ECS High Impact Excelsior</i>	Channel	Wood fiber mat produced of wood excelsior of 80% eight-inch or longer fiber lengths. Blanket shall be of consistent thickness and each side covered with a photo-degradable plastic mesh and stitched on 3" centers. Typical width = 7.5 feet; typical length - approx 96 feet; typical weight = 80 lbs/roll ±10%.
25	<i>ECS High Velocity Straw Mat</i>	Slope Channel	Mats produced of wheat straw filler and reinforced by lightweight, ¾" photo-degradable netting stitched on 1.5" centers. Typical width = 7.5 feet; typical length = approx 120 feet; typical weight = 55 lbs/roll ± 10%
26	<i>ECS Standard Excelsior</i>	Slope	Extra long fibers of interlocking stitched wood excelsior mat. Typical weight per roll = 68 lbs ± 10%; typical roll length = 96 feet; typical roll width = 7.5 feet.
27	<i>ECS Standard Straw</i>	Slope	Organic blanket made from virgin wheat straw covered on the top side by netting. Typical roll weight - 50 lbs ± 10%; typical roll width = 7.5 feet; typical roll length = 120 feet.
28	<i>Enkamat Composite 30 [99]</i>	Slope	No product literature had been furnished
29	<i>Enkamat® 7018</i>	Channel	Mat consisting of heavy nylon monofilaments fused at their intersection. 97% of the geomatrix shall be open space available for soil and root interaction. Matting will have three-dimensional stability without laminated or stitched layers. Typical weight = 8.6 oz/sq yd; typical roll length - 227 feet; typical roll width = 39 inches.
30	<i>Enkamat® 7020</i>	Channel	Mat consisting of heavy nylon monofilaments fused at their intersection. 97% of the geomatrix shall be open space available for soil and root interaction. Matting will have three-dimensional stability without laminated or stitched layers. Typical weight = 12 oz/sq yd; typical roll length - 227 feet; typical roll width = 39 inches.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
31	<i>Enkamat Composite NPK</i>	Channel	Three-dimensional black nylon mesh combined with a biodegradable mat bonded with high strength UV resistant thread.
32	<i>Enviro-Gro</i>	Mulch	Hydraulic mulch - no product literature available for this product.
33	<i>EnviroGuard Plus</i>	Slope	Natural soil amendment made from recycled waste paper and animal manure
34	<i>Enviroamat</i>	Channel	Manufacturer's literature not supplied.
35	<i>Evercycle™ Hydro-Mulch</i>	Mulch	Hydraulic mulch manufactured from municipal solid waste containing paper, plastics and organics. Generally free of weed seed and contain no growth-inhibiting foreign matter.
36	<i>Excel® Fibermulch II (with Exact-Tac™)</i>	Mulch	Hydraulic mulch manufactured from 100% Aspenwood fibers and contains measured amounts of a green, water-activated dye, and Exact-Tac™ tackifier. Typical moisture content = 10% ± 3%; typical ash content = 0.7% ± 0.2% (OD basis)
37	<i>FORMULA 480 Liquid Clay</i>	Slope	Biodegradable clay concentrate formulated to combine properties of minerals and tight film to give strength and resistance to water. Semi-paste consistency once mixed with water. Product permits needed ground vapors to escape. Total solids=49WT%; wt/Gal 9.0 lbs.
38	<i>Futerra®</i>	Slope	Lightweight, nonwoven erosion control blanket composed primarily of virgin wood fiber with a small percentage of recycled synthetic fibers. Accelerated photodegradable polypropylene netting is laminated to the surface of the blanket. Typical roll widths = 40 & 82 inches; typical roll length = 135 feet; typical roll weight (40 inch) = 20 lbs ± 10%; typical roll weight (82 inch) = 42 lbs ± 10%.
39	<i>Geocoir®/DeKoWe® 700</i>	Slope	100% spun coir mat derived from the husk of coconuts. Typical weight = 20.6 oz / sq yd; typical open area 50%; typical roll length = 50 meters; typical roll width = 1, 2, 3 or 4 meters.
40	<i>Geogro</i>	Slope	No product literature available
41	<i>Geojute® Plus</i>	Slope	Woven jute mat, undyed and unbleached. Yarn count 78 - width warp; 180 per linear yard weft; typical roll weight = 2.82 lbs/linear yard; typical roll length 100 feet; typical roll width = 4 feet.
42	<i>Geojute® Plus 1</i>	Slope	No product literature available.
43	<i>Geojute® Plus - Regular High Velocity</i>	Channel	No product literature available
44	<i>Grass Mat</i>	Channel	100% biodegradable blend of natural fibers from the kenaf plant; lightweight and flexible; Typical roll width of 5'; typical roll length = 50'.
45	<i>Greenfix CFO72RP [99]</i>	Slope	No product literature had been furnished.
46	<i>Greenfix CFO72RR (00)</i>	Channel	Three dimensional black nylon mesh combined with a biodegradable coconut mat bonded together with a high strength UV resistant thread and net. Rolls are 6.5 x 55.5 feet.
47	<i>Greenfix WSO72 [99]</i>	Slope	Blanket containing 100% fiber content; roll width = 8'; roll length = 67.5 feet; Roll area = 60 sq yds; Weight = 0.70 Lbs./Sq Yd; Weight per blanket = 42 lbs; Functional longevity = 10-12 months; light photodegradable top netting and medium photodegradable bottom netting.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
48	<i>GREENSTREAK® PEC-MAT™</i>	Channel Slope	Flexible mat of non-woven, randomly-oriented monofilaments, thermally welded together into a three-dimensional porous web. Typical weight = 28 oz / sq yd; typical roll width = 6 feet.
49	<i>K-MAT [98]</i>	Slope	Bonded fiber matrix of blended natural and cellulose fiber. Inseparable green in color. Organic matter >99%; moisture content = 12% ±3%; water holding capacity = 1,300 grams per 100 grams of fiber; pH range 6.5 ±1%
50	<i>KoirMat™ 400</i>	Slope	No product literature available
51	<i>Koirmat™ 700</i>	Channel	Made from 100% white coir fiber. Typical thickness = 0.30 inch; typical mass per unit area (min) = 20 lb/sq yd;
52	<i>KoirMat™ 740</i>	Channel	No product literature available
53	<i>Landlok® BonTerra® CS2™</i>	Slope	70% straw and 30% coconut fiber mat with a lightweight photo-degradable netting on the bottom side, and a long-lasting, UV-stabilized netting on the top side, sewn on two inch centers. Typical roll weight = 40 lbs (0.5 lbs/sq yd); Typical roll length = 90 feet; typical roll width = 7.5 feet.
54	<i>Landlok BonTerra C2</i>	Channel	100% mattress grade coconut fiber (0.670 lb/sy) covered on both sides by netting sewn with UVI treated polypropylene, black thread minimum 1000 denier. Typical width = 7.5 feet; typical length = 90 feet; typical roll weight = 45 lbs.
55	<i>Landlok® BonTerra® EcoNet™ ENCS2</i>	Slope	Manufactured from 70% wheat straw (.35 lb/sy) and 30% coconut fiber by weight (.15 lb/sy); machine-fabricated mat covered on both sides by a biodegradable netting and sewn on two inch centers. Typical width = 7.5 ft; typical length = 90- feet; typical weight = 48 lbs approx.
56	<i>Landlok® BonTerra® S1</i>	Slope	Machine-produced mat of 100%, weed-free wheat straw by weight, covered on the top side with a lightweight, photodegradable polypropylene netting with an approximate 1/2" x 1/2" opening, sewn together on 2 inch centers. Typical weight = 0.5 lbs/sq yd. Typical roll length = 90 feet. Typical roll width = 7.5 feet.
57	<i>Landlok® BonTerra® S2</i>	Slope	Machine-produced mat of 100% weed-free wheat straw by weight, covered on the top and bottom sides with a lightweight, photodegradable, polypropylene netting with approximate 1/2" x 1/2" openings, sewn together on two inch centers. Typical weight = 0.5 lbs/sq yd; typical roll width = 7.5 feet; typical roll length = 90 feet.
58	<i>Landlok® BonTerra® SFB™</i>	Channel	Manufactured from 100% synthetic polyolefin staple fiber, homogeneously blended and evenly distributed, covered on both sides by high strength oriented netting, and sewn together on two-inch centers. Fiber = 10 oz/sy; Netting on both sides approx 3 lb/1000 sf; Thread UVI treated polypropylene, min 1000 denier; Typical width - 7.5 ft; Typical length = 90 feet;
59	<i>Landlok® BonTerra® SFB12™</i>	Channel	100% synthetic fiber mat consisting of long-lasting, UV-stabilized netting on the bottom, and heavy-duty, UV-stabilized netting on the top, sewn on two inch centers. Typical roll weight = 57 lbs. Typical roll width = 7.5 feet. Typical roll length = 90 feet.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
60	<i>LANDLOK® BonTerra EcoNet ENS2</i>	Slope	Manufactured from 100% weed free wheat straw by weight (0.50 lb/sy), covered on both sides by biodegradable netting and sewn on two inch centers with high wet strength kraft thread. Typical width = 7.5 feet; typical length = 90 feet; typical weight = 48 lbs approx.
61	<i>Landlok ® BonTerra® CP2</i>	Channel	50% coconut fiber, .38 lb/SY - 50% UVI treated polypropylene fiber - .38 lb/SY; UVI treated polypropylene black thread; typical roll width = 7.5 feet; typical roll length = 90 feet. Bottom net UVI treated polypropylene openings of approx 5/8" x 5/8". Top net UVI treated polypropylene with openings of approx 1/2" x 1/2".
62	<i>Landlok BonTerra EcoNet ENC2</i>	Channel	100% mattress grade coconut fiber (.60 lb/SY) with high wet strength kraft leno weave netting on top and bottom sewn together on 2 inch centers with approximate openings of 1/2" x 1". Typical roll width - 7.5 feet; typical roll length = 90 feet.
63	<i>Landlok® 407GT</i>	Slope	Flexible, non-organic, open-weave geotextile consisting of perpendicular rows of multifilament and tape yarns woven together resulting in a dimensionally-stable matrix. Typical weight = 10.5 oz / sq yd; typical width = 6.5 feet; typical length - 138.5 feet.
64	<i>Landlok® FRS 3112</i>	Slope	Fiber roving system consisting of continuous fibrillated, fine-denier, polypropylene yarn fibers, processed such that interlocking fibrils attach to slightly coarser stem fibrils, without UV stabilization, designed for application through an air-gun process. Typical yarn is wound onto two, cylindrical packages weighing 18 - 25 lbs.
65	<i>Landlok® TRM 435</i>	Slope Channel	Dense web of green polypropylene fibers positioned between two biaxially-oriented nets and mechanically bound together by parallel stitching with polypropylene thread. Matrix is stabilized against ultraviolet degradation and inert to chemicals normally found in a natural soil environment. Typical mass per unit area = 8.5 oz/yd <sup>2</sup> ; typical thickness 0.40 inch; typical ground cover factor = 70%; typical roll sizes = 6.5 feet x 138.5 feet (100 yd <sup>2</sup> - 50 lbs).
66	<i>Landlok® TRM 450</i>	Channel	Dense, three-dimensional web of polyolefin fibers positioned between two, biaxially-oriented nets and mechanically bound together by parallel stitching with polyolefin thread. Typical weight = 10.5 oz / sq yd; typical roll width = 12.5 feet (4 ft width optional).
67	<i>Landlok TRM 1050 [99]</i>	Slope	Turf reinforcement mat consisting of a lofty web of black polypropylene fibers positioned between two high strength nets, mechanically bound together by parallel stitching with polypropylene thread. Every component is UV stabilized. Mass per unit area = 10.0 oz/ sq yd; thickness = 0.40 inch; ground cover factor = 50%.
68	<i>Landlok TRM 1060 (00)</i>	Channel	Three-dimensional web of black polyolefin fibers bound between two high strength, biaxially oriented nets.
69	<i>Lay-Low Mulch</i>	Mulch	Hydraulic mulch composed of natural cellulose fiber; water holding capacity = 1400%; moisture content = 7.9%; organic matter = 99.2%; Ash content = 0.75; pH range = 6.5; Boron = 22ppm

# General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
70	<i>Miramat® 1000</i>	Slope	A flexible, three-dimensional web of bonded polypropylene monofilaments. Typical weight = 9.6 oz /sq yd; typical roll width = 4.3 feet; typical roll length = 210 feet.
71	<i>Miramat® TM8™</i>	Channel	Flexible, three-dimensional synthetic mat. Typical weight = 12 of / sq yd; typical roll width = 12 feet; typical roll length = 100 feet.
72	<i>Mul.timat 100 [99]</i>	Slope	Turf reinforcement matrix and erosion control revegetation matrix blanket is a three-dimensional structure securing two high strength, high modulus biaxially oriented nets above and below a corrugated center netting. Mass per unit area = 9.4 oz/sq yd; thickness = 700 mills; roll width = 7.2 feet; roll length = 98.5 feet; roll area = 710 feet.
73	<i>North American Green C125 BN</i>	Channel	Machine-produced 100% biodegradable mat with 70% agricultural straw and 30% coconut fiber blend matrix. Blanket is covered on top and bottom sides with 100% biodegradable woven natural organic fiber netting. Roll width 6.5 feet; roll length 83.5 feet; roll weight 40 lbs ±10%; roll area 60 sq yds.
74	<i>North American Green C350™ Three Phase™</i>	Channel	100% coconut fiber, stitch-bonded between a heavy-duty, UV-stabilized bottom net, and a heavy-duty, UV-stabilized cusped (crimped) middle netting, overlaid with a heavy duty, UV-stabilized top net. The three nettings are stitched together on 1.5 inch centers, with UV-stabilized, polyester thread. Typical weight = 0.92 lbs /sq yd
75	<i>North American Green P350</i>	Channel	Permanent mat consisting of 100% UV stabilized high denier polypropylene fiber stitch bonded between heavy duty UV stabilized bottom net and a heavy duty UV stabilized crimped middle netting overlaid with a heavy duty UV stabilized top net. Typical mass per unit area - 1.0 lb/SY; typical roll width = 6.2 feet; typical roll length = 55.5'.
76	<i>North American Green S150</i>	Slope Channel	Machine-produced mat of 100% agricultural straw, covered on the top and bottom sides with a polypropylene net having an approximate opening of ½" x ½", and sewn together by cotton thread. Typical roll weight = 30 lbs ± 10% per roll; typical roll width = 6.5 feet; typical roll length - 83.5 feet.
77	<i>North American Green S150 BN [98]</i>	Slope	Machine-produced, 100% biodegradable mat with agricultural straw fiber matrix. Mat covered on top and bottom with 100% biodegradable woven natural fiber net. Typical roll weight = 40 lbs ± 10%; typical roll length = 83.5 feet ± 5%; typical roll width = 6.5 feet ± 5%.
78	<i>North American Green S350</i>	Channel	Machine produced mat of 100% wheat straw matrix. Mat is covered with super heavy duty polypropylene matting. Rolls are 6.5x55.5 feet that covers 40 sq. yards.
79	<i>North American Green S75</i>	Slope	Machine-produced mat of 100% agricultural straw, covered on the top side with a polypropylene net having an approximate ½" x ½" mesh, sewn together with cotton thread. Typical roll weight = 30 lbs ± 10%; typical roll length = 83.5 feet.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
80	<i>North American Green S75 BN</i>	Slope	Machine-produced mat of 100% straw fiber. The blanket shall be covered on the top side with a 100% biodegradable woven natural organic fiber netting having an approx ½” x 1” opening. Typical roll width = 6.5 feet; typical roll length = 83.5 feet; typical roll weight = 35 lbs ± 10%.
81	<i>North American Green SC150 BN</i>	Slope	
82	<i>North American Green SC150</i>	Slope	Machine-produced mat consisting of 70% agricultural straw and 30% coconut fiber, covered on the top side by a polypropylene net having an approx 5/8” x 5/8” mesh, and on the bottom side by a polypropylene net with an approx ½” x ½” mesh, sewn together with cotton thread. Typical roll weight = 30 lbs ± 10% per roll; typical roll length = 83.3 feet; typical roll width = 6.5 feet.
83	<i>Oasis Fiber Mulch</i>	Mulch	Manufactured from a blend of 100% recycled fiber without growth or germination inhibiting factors. Moisture content 12%± 3%; Ash content 4%±3%; Organic matter = 96% ±2%; Moisture holding capacity = 1200-1500 grams per 100 grams oven dry fiber
84	<i>PennzSuppress®</i>	Slope Mulch	No literature available
85	<i>Permamat 150F</i>	Channel	Biodegradable mat produced from heavy Aspen wood excelsior, underlaid with a non-woven fabric and encapsulated by a permanent UV stabilizing netting with a minimum life expectancy of 20 years. Typical roll width 4 or 8 feet; typical roll length - 75 or 50 feet; typical roll weight - 58 lbs or 77 lbs.
86	<i>Permamat 200F</i>	Channel	Machine-produced mat of evenly distributed Aspen wood excelsior fibers, 80% of which are six-inches or longer. The mat is completely encased in a black, extruded-plastic netting, treated to retain intact both in direct sunlight and when buried. The netting mesh size is approx ¾” x 3/8”. Plasting netting is securely attached to the excelsior. Typical weight = 2.34 lbs/sq yd; typical roll length = 75 feet; typical roll width = 4 feet.
87	<i>POZ-O-CAP®</i>	Slope	Product consisting of dry powder mix of cementitious and hydrated lime, with a dry, cellulose-derived fiber reinforcing additive, applied through standard hydraulic seeding processes.
88	<i>Pro Mat®</i>	Mulch	Recycled cellulose fiber mulch manufactured from corrugated paper fibers. Typical bag width = 50 lbs; typical moisture content = 12% ± 3%; typical ash content = 1.6% maximum.
89	<i>Pro Mat® XL</i>	Mulch	Natural, cellulose wood fiber hydro-mulch, manufactured from 85% recycled newspaper. Ash content less than 1.6% (dust); moisture content of not more than 15%.
90	<i>Pro Mat® XL with Airtak</i>	Mulch	Natural, cellulose wood fiber hydro-mulch, manufactured from 85% recycled newspaper. Ash content less than 1.6% (dust); moisture content of not more than 15%. No product literature available on Airtak.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
91	<i>Pyramat®</i>	Channel	Three-dimensional, lofty, woven woven polypropylene geotextile, composed of polypropylene monofilament yarns woven into a uniform configuration of resilient pyramid-like projections. Typical weight = 15 oz / sq yd; typical roll length = 90 feet; typical roll width = 6 feet.
92	<i>Second Nature® Regenerated Wood Fiber Mulch</i>	Mulch	Recycled, natural fiber mulch. Typical bag weight = 50 lbs; typical moisture content = 12% ± 3%.
93	<i>Seed-Guard™</i>	Slope	Natural green mat woven from photo-degradable, polypropylene yarns
94	<i>Silva-Fiber Plus®</i>	Mulch	100% virgin wood fiber with 3% tackifier. Typical bag weight = 50 lbs; typical moisture content = 12% ± 3%; typical ash content 1.0%
95	<i>Soil Guard™</i>	Slope	A bonded fiber matrix material produced from 100% wood fiber with natural binders. The product is designed to disperse rapidly in water, remain in uniform suspension under agitation, and be applied through standard hydraulic seeding processes.
96	<i>SuperGro™</i>	Slope	Flexible, light-weight geocomposite, consisting of nonwoven, isotactic, polypropylene staple, uniform fiber blanket, reinforced with polypropylene netting, earthtone in color. Typical weight = 1.0 oz / sq yd; typical roll length - 250 linear yards; typical roll width = 4 feet.
97	<i>Tensar TB 1000</i>  <b>*** NO LONGER AVAILABLE ***</b>	Slope Channel	Lofty web of polyolefin fibers between two, tigh-strength, biaxially-oriented nets, and bound securely together by parallel stitching with polyolefin thread, stabilized against ultraviolet degradation and inert to chemicals normally encountered in a natural soil environment. Typical weight = 10 oz per yd (ASTM D-3776); typical roll length = 120 feet; typical width = 7.5 feet. <b>*** By letter of 1/28/2000, Tensar Earth Technologies, Inc., advised that this product is no longer being manufactured ***</b>
98	<i>Tensar™ Erosion Mat TM 3000</i>  <b>*** NO LONGER AVAILABLE***</b>	Channel	Consists of polymer nettings, fused at the intersections of the fibers and formed into a strong and dimensionally stable mat. Material is UV stabilized with a minimum of 2% carbon black. Typical weight = 12 oz / sq yd (min); typical roll length = 100 feet; typical roll width = 5 feet. <b>*** By letter of 1/28/2000, Tensar Earth Technologies, Inc., advised that this product is no longer being manufactured ***</b>
99	<i>Terra Control</i>	Slope	Polyvinylacetate disperson containing easily-biodegradable plasticizers, formulated as a milky-white, bio-degradable synthetic resin dispersion in water, designed for hydraulic applications.
100	<i>verdylol® ERO-MAT™</i>	Slope	Machine-produced mat of agricultural straw, covered on one side of the blanket with a photodegradable, synthetic mesh adhered to the straw by a knitting process using degradable thread. Typical roll weight = 50 lbs ± 1 lb per roll; typical width = 7.5 feet; typical length = 120 feet.

General Product Material Descriptions

Brand Name of Product		Tested As	Material Description
101	<i>verdyol® EXCELSIOR High Velocity</i>	Slope Channel	Machine-produced mat of 100% clean wood excelsior fibers processed from hardwood. The top and bottom sides of the blanket is covered with an extruded, degradable polypropylene netting of ¾" x ¾" openings. Typical weight = 1.1 lbs / sq yd; typical roll width = 7.5 feet; typical roll length = 96 feet.
102	<i>verdyol® EXCELSIOR Standard</i>	Slope	Machine-produced mat of 100% clean wood excelsior fibers processed from hardwood. The top and bottom sides of the blanket is covered with an extruded, degradable polypropylene netting of ¾" x ¾" openings. Typical weight = 0.85 lbs / sq yd; typical roll width = 7.5 feet; typical roll length = 96 feet.
103	<i>Xcel PP5</i>	Channel	Manufacturer's literature not provided.
104	<i>Xcel Regular®</i>	Slope	Machine-produced mat of curled wood excelsior of 80%, six-inch or longer fiber length, covered on the top side by a photo-degradable extruded plastic net. Typical weight = 0.98 lbs / sq yd ± 0.10 lbs / sq yd; typical width = 48 inches ± 1 inch; typical length = 180 feet (min)
105	<i>Xcel Superior®</i>	Slope	Machine-produced mat of curled wood excelsior of 80%, six-inch or longer fiber length, covered on the top and bottom sides by a photo-degradable, extruded plastic net. Typical weight = 1.0 lbs /sq yd ± 0.1 lbs /sq yd; typical width = 48 inches ± 1 inch; typical length = 180 feet (min)



Slope Protection Applications  
Record of Product Evaluations

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1991	1	<i>Anti-Wash®/Geojute®</i>	XXX	XXX		
	2	<i>Curlex® I</i>	XXX	XXX	XXX	XXX
	3	<i>Greenstreak® Pec-Mat™</i>	XXX	XXX	XXX	XXX
	4	<i>Landlok® 407GT</i>	XXX	XXX		
	5	<i>North American Green S75</i>			XXX	XXX
	6	<i>North American Green S150</i>	XXX	XXX		
	7	<i>North American Green SC150</i>	XXX	XXX		
	8	<i>verdyl® ERO-MAT®</i>			XXX	XXX
	9	<i>Xcel Regular</i>			XXX	XXX
	10	<i>Xcel Superior</i>	XXX	XXX		

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1992	1	<i>Airtrol™</i>	XXX	XXX	XXX	XXX
	2	<i>Curlex™ I</i>		XXX	XXX	XXX
	3	<i>Geocoir®/DeKoWe® 700</i>	XXX	XXX		

1993	Entire Cycle Canceled due to Weather Damage					
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Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1994	1	<i>Airtrol®</i>		XXX		XXX
	2	<i>Curlex® I</i>		XXX		XXX
	3	<i>Geocoir®/DeKoWe® 700</i>		XXX		
	4	<i>Geojute® Plus</i>	XXX	XXX		
	5	<i>Miramat® 1000</i>	XXX	XXX		
	6	<i>Soil Guard™</i>	XXX	XXX		
	7	<i>Super Gro™</i>	XXX	XXX	XXX	XXX

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1995	1	<i>Airtrol®</i>		XXX		XXX
	2	<i>Landlok® BonTerra® S1™</i>			XXX	XXX
	3	<i>Landlok® BonTerra® S2™</i>	XXX	XXX		
	4	<i>Curlex® I</i>				XXX
	5	<i>ECS Straw Blanket Standard</i>			XXX	XXX
	6	<i>Geocoir®/DeKoWe® 700</i>		XXX		
	7	<i>Geojute® Plus I</i>	XXX	XXX		
	8	<i>Landlok® FRS 3112</i>	XXX	XXX		
	9	<i>Miramat® TM8™</i>	XXX	XXX		
	10	<i>POZ-O-CAP®</i>			XXX	XXX
	11	<i>SuperGro™</i>		XXX	XXX	XXX
	12	<i>verdyl® Excelsior Standard</i>			XXX	XXX
	13	<i>verdyl® Excelsior High Velocity</i>	XXX	XXX		

Slope Protection Applications  
Record of Product Evaluations

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1996	1	<i>Airtrol® Plus</i>	XXX	XXX		
	2	<i>Landlok® BonTerra® S2™</i>		XXX		
	3	<i>Landlok® BonTerra® CS2™</i>	XXX	XXX		
	4	<i>Curlex®™-LT</i>			XXX	XXX
	5	<i>ECS Excelsior Blanket Standard</i>			XXX	XXX
	6	<i>Geogro</i>	XXX	XXX	XXX	XXX
	7	<i>Geojute® Plus 1</i>	XXX	XXX		
	8	<i>KoirMat™ 400</i>	XXX	XXX		
	9	<i>Landlok® FRS 3112</i>		XXX		
	10	<i>North American Green S75</i>	XXX	XXX		
	11	<i>POZ-O-CAP®</i>			XXX	XXX
	12	<i>Seed-Guard™</i>	XXX	XXX		
	13	<i>Tensar® Erosion Blanket TB1000</i>	XXX	XXX		
	14	<i>Terra-Control®</i>			XXX	XXX
	15	<i>verdyl® Excelsior High Velocity</i>	XXX	XXX		

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1997	1	<i>Airtrol® Plus</i>	XXX	Destroyed*		
	2	<i>BioD-Mesh™ 60</i>			XXX	XXX
	3	<i>Landlok® BonTerra® CS2™</i>	XXX			
	4	<i>Landlok® BonTerra® EcoNet™ ENCS2</i>	XXX	Destroyed*		
	5	<i>Landlok® BonTerra® EcoNet™ ENS2</i>			XXX	XXX
	6	<i>Curlex™-LT</i>			XXX	
	7	<i>EcoAegis™</i>	XXX	Destroyed*	XXX	XXX
	8	<i>ECS High Velocity Straw Mat</i>	XXX	Destroyed*		
	9	<i>Geogro</i>	XXX	Destroyed*	XXX	XXX
	10	<i>Landlok™ TRM 435</i>	XXX	Destroyed*		
	11	<i>North American Green S75</i>		Destroyed*		
	12	<i>Terra-Control®</i>			XXX	XXX
*In June, 1997, an intense rainstorm destroyed all products installed on the 1:2 Sand Plots. Due to lack of compatible growing season length, products were not re-installed.						

Slope Protection Applications  
Record of Product Evaluations

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1998	1	<i>Landlok® BonTerra® EcoNet™ ENCS2</i>		XXX		
	2	<i>EcoAegis™</i>	XXX	XXX		XXX
	3	<i>ECS High Velocity Straw Mat</i>		XXX		
	4	<i>EnviroGuard Plus</i>	XXX	XXX	XXX	XXX
	5	<i>Formula 480 Liquid Clay</i>	XXX	XXX		
	6	<i>Futerra</i>	XXX	XXX	XXX	XXX
	7	<i>K-MAT</i>	XXX	XXX	XXX	XXX
	8	<i>Landlok™ TRM 435</i>		XXX		
	9	<i>North American Green S150 BN</i>	XXX	XXX		
	10	<i>North American Green S75</i>		XXX		
	11	<i>North American Green S75 BN</i>			XXX	XXX
	12	<i>PennzSuppress®</i>	XXX	XXX		

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
1999	1	<i>Conwed 3000 Bonded Fiber Matrix</i>	XXX	XXX	XXX	XXX
	2	<i>EarthBound</i>	XXX	XXX	XXX	XXX
	3	<i>Econo-Jute</i>	XXX	XXX	XXX	XXX
	4	<i>ECS Standard Straw</i>	XXX	XXX		
	5	<i>EnviroGuard Plus</i>	XXX	XXX		XXX
	6	<i>Grass Mat</i>	XXX	XXX	XXX	XXX
	7	<i>Greenfix WSO72</i>	XXX	XXX		
	8	<i>Landlok BonTerra CS2</i>	XXX			
	9	<i>Pennzsuppress</i>		XXX		

Cycle	No	Product Evaluated	1:2 Clay	1:2 Sand	1:3 Clay	1:3 Sand
2000		Entire cycle was lost due to slope failure from inclement weather				

Slope Protection Applications  
Final Performance Analysis, 1991 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
1						
2	Entire Cycle was lost due to slope failure from inclement weather					
3						
4						
5						
6						
7						
8						
PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
	Landlok® TRM 435	1997	1:2	Clay	0.18	92.28
	Curlex® I	1991			0.19	97.83
	ECS High Velocity Straw Mat	1997			0.20	85.58
	North American Green SC150	1991			0.21	89.98
	Geocoir®/DeKoWe® 700	1992			0.22	73.72
	North American Green S150	1991			0.23	92.01
	Landlok® 407GT	1991			0.24	96.15
	Airtrol®	1992			0.24	86.09
	KoirMat™ 400	1996			0.25	74.07
	Landlok BonTerra EcoNet ENCS2	1997			0.25	90.39
	Greenstreak® PEC-MAT™	1991			0.25	87.58
	EnviroGuard Plus	1999			0.26	95.94
	Soil Guard™	1994			0.27	83.99
	Anti-Wash®/Geojute®	1991			0.27	90.06
	Landlok® FRS 3112	1995			0.28	96.51
	Greenfix WSO72	1999			0.28	85.91
	Landlok BonTerra CS2	1999			0.28	87.29
	Futerra®	1998			0.29	90.83
	Landlok® BonTerra® CS2™	1996			0.30	71.98
	North American Green S75	1996			0.31	87.39
	verdyl® Excelsior High Velocity	1996			0.31	82.48
	Formula 480 Liquid Clay	1998			0.31	86.38
	Conwed 3000 BFM	1999			0.31	84.98
	EarthBound	1999			0.31	81.23
	ECS Standard Straw	1999			0.31	81.77
	Miramat® TM8™	1995			0.32	91.24
	Landlok® BonTerra® S2™	1995			0.32	96.58
	Xcel Superior	1991			0.32	98.81
	Geojute® Plus 1	1996			0.32	79.75
	North American Green® S150 BN	1998			0.32	95.92
	Tensar® Erosion Blanket TB1000	1996			0.33	91.24
	SuperGro™	1994			0.33	96.35

Sediment Loss is expressed as “kilograms per 10 square meters:

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

Slope Protection Applications  
Final Performance Analysis, 1991 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
	<i>Pennzsuppress®</i>	1998	1:2	Clay	0.33	83.96
	<i>Landlok® BonTerra® CS2™</i>	1997			0.35	89.55
	<i>EcoAegis™</i>	1998			0.36	82.33
	<i>EcoAegis™</i>	1997			0.37	82.98
	<i>K-Mat</i>	1998			0.37	85.66
	<i>EnviroGuard Plus</i>	1998			0.38	81.41
	<i>Grass Mat</i>	1999			0.39	81.05
	<i>Geojute® Plus 1</i>	1995			0.39	83.35
	<i>verdylol® Excelsior High Velocity</i>	1995			0.39	88.84
	<i>Airtrol® Plus</i>	1996			0.40	71.51
	<i>Geogro</i>	1996			0.42	87.30
	<i>Miramat® 1000</i>	1994			0.42	65.81
	<i>Seed-Guard™</i>	1996			0.42	74.21
	<i>Geojute® Plus</i>	1994			0.69	72.65
	<i>Airtrol® Plus</i>	1997			1.04	81.51
	<i>CONTROL</i>	91-98			2.06	74.70
	<i>Geogro</i>	1997			2.29	78.76

Sediment Loss is expressed as “kilograms per 10 square meters:

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

Slope Protection Applications  
Final Performance Analysis, 1991 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
1						
2	Entire Cycle was lost due to slope failure from inclement weather					
3						
4						
5						
6						
7						
8						
PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
1	<i>Soil Guard™</i>	1994	1:2	Sand	8.04	86.74
2	<i>Geojute® Plus</i>	1994			8.16	3.88
3	<i>SuperGro™</i>	1994			8.97	69.57
4	<i>Curlex® I</i>	1994			9.12	89.46
5	<i>Geocoir®/DeKoWe® 700</i>	1994			10.39	49.62
6	<i>Miramat® 1000</i>	1994			11.82	81.47
7	<i>Airtrol®</i>	1994			13.42	17.61
8	<i>Landlok® FRS 3112</i>	1995			14.25	64.76
9	<i>Landlok® BonTerra® S2™</i>	1995			15.30	68.35
10	<i>Xcel Superior</i>	1991			15.68	85.81
11	<i>verdyl® Excelsior High Velocity</i>	1995			16.73	63.54
12	<i>Tensar® Erosion Blanket TB1000</i>	1996			16.82	65.71
13	<i>Landlok® FRS 3112</i>	1996			16.94	90.42
14	<i>Landlok® 407GT</i>	1991			18.77	74.30
15	<i>EnviroGuard Plus</i>	1999			19.63	94.50
16	<i>Landlok® BonTerra® CS2™</i>	1996			19.98	70.76
17	<i>North American Green SC150</i>	1991			20.82	76.41
18	<i>Curlex® I</i>	1992			21.81	47.34
19	<i>ECS Standard Straw</i>	1999			23.61	78.67
20	<i>Miramat® TM8™</i>	1995			22.73	85.60
21	<i>SuperGro™</i>	1995			23.17	51.09
22	<i>Landlok® TRM 435</i>	1998			23.38	72.57
23	<i>Seed-Guard™</i>	1996			23.40	66.88
24	<i>Futerra®</i>	1998			23.76	75.17
25	<i>North American Green S150</i>	1991			23.92	84.75
26	<i>Landlok® BonTerra® ENCS2™</i>	1998			24.43	82.76
27	<i>Geocoir®/DeKoWe® 700</i>	1995			24.59	49.19
28	<i>Greenfix WSO72</i>	1999			24.89	82.28
29	<i>ECS High Velocity Straw Mat</i>	1998			25.14	76.85
30	<i>Landlok® BonTerra® S2™</i>	1996			25.23	83.24
31	<i>North American Green® S150 BN</i>	1998			25.40	76.48
32	<i>Geojute® Plus 1</i>	1996			26.11	80.40

Sediment Loss is expressed as “kilograms per 10 square meters:

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

Slope Protection Applications  
Final Performance Analysis, 1991 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
33	<i>Formula 480 Liquid Clay</i>	1998	1:2	Sand	26.24	68.85
34	<i>North American Green® S75</i>	1998			26.42	68.91
35	<i>verdylol® Excelsior High Velocity</i>	1996			26.98	38.09
36	<i>North American Green S75</i>	1996			27.01	72.06
37	<i>Geojute® Plus 1</i>	1995			27.03	80.80
38	<i>KoirMat™ 400</i>	1996			27.05	57.44
39	<i>Conwed 3000 BFM</i>	1999			27.31	73.88
40	<i>Geogro</i>	1996			27.33	70.47
41	<i>EnviroGuard Plus</i>	1998			27.42	73.38
42	<i>Pennzsuppress</i>	1999			27.53	63.41
43	<i>EarthBound</i>	1999			27.85	72.54
44	<i>K-Mat</i>	1998			28.94	64.66
45	<i>Curlex® I</i>	1991			29.80	52.67
46	<i>EcoAegis™</i>	1998			29.98	81.01
47	<i>Airtrol® Plus</i>	1996			30.00	72.79
48	<i>Anti-Wash®/Geojute®</i>	1991			30.30	51.37
49	<i>Econ-Jute</i>	1999			30.79	64.78
50	<i>Greenstreak® PEC-MAT™</i>	1991			31.14	38.86
51	<i>Grass Mat</i>	1999			32.17	71.98
52	<i>Airtrol</i>	1992			37.89	41.88
53	<i>CONTROL</i>	91-99			50.34	31.96

Note: In June, 1997, an intense rainstorm destroyed all products which had been installed for evaluation on the 1:2 Sand plots. Due to lack of compatible growing season now remaining compared to previously completed evaluation cycles, the products were not re-installed and evaluated

Sediment Loss is expressed as “kilograms per 10 square meters:

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

Slope Protection Applications  
Final Performance Analysis, 1991 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
1						
2	Entire Cycle was lost due to slope failure from inclement weather					
3						
4						
PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
1	<i>SuperGro™</i>	1994	1:3	Clay	0.08	70.38
2	<i>Curlex® I</i>	1992			0.12	98.13
3	<i>Curlex® I</i>	1991			0.15	63.23
4	<i>verdylol® ERO-MAT®</i>	1991			0.15	87.81
5	<i>Landlok BonTerra EcoNet ENS2</i>	1997			0.15	82.26
6	<i>Curlex™-LT</i>	1997			0.18	85.37
7	<i>Greenstreak® PEC-MAT™</i>	1991			0.20	90.53
8	<i>Terra Control</i>	1997			0.22	83.32
9	<i>Airtrol®</i>	1992			0.24	86.44
10	<i>ECS Excelsior Blanket Standard</i>	1996			0.25	83.36
11	<i>Landlok® BonTerra® S1™</i>	1995			0.25	93.42
12	<i>BioD-Mesh™ 60</i>	1997			0.26	81.19
13	<i>North American Green S75</i>	1991			0.27	96.19
14	<i>Futerra®</i>	1998			0.27	87.79
15	<i>Curlex™-LT</i>	1996			0.28	75.39
16	<i>ECS Straw Blanket Standard</i>	1995			0.29	90.71
17	<i>Econo-Jute</i>	1999			0.29	82.98
18	<i>Conwed 3000 BFM</i>	1999			0.30	84.56
19	<i>SuperGro™</i>	1995			0.31	89.42
20	<i>EcoAegis™</i>	1997			0.31	82.10
21	<i>North American Green® S75 BN</i>	1998			0.31	86.81
22	<i>Xcel Regular</i>	1991			0.32	90.17
23	<i>verdylol® Excelsior Standard</i>	1995			0.32	92.21
24	<i>EnviroGuard Plus</i>	1998			0.32	82.00
25	<i>K-Mat</i>	1998			0.32	57.05
26	<i>EarthBound</i>	1999			0.33	81.07
27	<i>Grass Mat</i>	1999			0.34	82.31
28	<i>Terra-Control®</i>	1996			0.35	92.09
29	<i>POZ-O-CAP®</i>	1995			0.36	83.48
30	<i>Geogro</i>	1996			0.38	87.95
31	<i>POZ-O-CAP®</i>	1996			0.42	90.31
32	<i>Geogro</i>	1997			0.43	77.39
33	<i>CONTROL</i>	91-98			1.24	74.43

Sediment Loss is expressed as “kilograms per 10 square meters:

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”



Slope Protection Applications  
Final Performance Analysis, 1991 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE 2000 CYCLE ONLY						
1						
2	Entire Cycle was lost due to slope failure from inclement weather					
3						
4						
5						
PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES						
No	Product Name	Year	Slope	Soil	Sediment Loss	Vegetation Density
1	<i>Curlex® I</i>	1994	1:3	Sand	2.94	48.63
2	<i>SuperGro™</i>	1994			3.00	39.19
3	<i>Curlex® I</i>	1992			4.12	37.26
4	<i>Curlex® I</i>	1991			4.41	60.22
5	<i>Xcel Regular</i>	1991			4.71	70.51
6	<i>Landlok® BonTerra® S1™</i>	1995			6.29	77.09
7	<i>verdylol® Excelsior Standard</i>	1995			7.41	75.33
8	<i>Curlex® I</i>	1995			7.84	63.96
9	<i>Landlok BonTerra EcoNet ENS2</i>	1997			7.98	82.87
10	<i>ECS Straw Blanket Standard</i>	1995			8.06	80.28
11	<i>North American Green S75</i>	1991			8.10	81.06
12	<i>Curlex™-LT</i>	1996			8.47	76.03
13	<i>EnviroGuard Plus</i>	1999			8.61	94.50
14	<i>verdylol® ERO-MAT®</i>	1991			9.08	73.20
15	<i>Airtrol®</i>	1994			9.26	27.82
16	<i>SuperGro™</i>	1995			9.74	56.89
17	<i>ECS Excelsior Blanket Standard</i>	1996			10.01	77.25
18	<i>Terra-Control®</i>	1997			10.48	81.60
19	<i>EarthBound</i>	1999			11.06	72.09
20	<i>Futerra®</i>	1998			11.19	72.17
21	<i>North American Green® S75 BN</i>	1998			11.44	75.55
22	<i>Econo-Jute</i>	1999			11.74	63.41
23	<i>EcoAegis™</i>	1998			11.93	71.75
24	<i>EnviroGuard Plus</i>	1998			12.04	50.74
25	<i>K-Mat</i>	1998			12.14	65.21
26	<i>EcoAegis™</i>	1997			12.26	75.19
27	<i>Airtrol®</i>	1992			12.39	55.65
28	<i>Airtrol®</i>	1995			13.02	26.18
29	<i>BioD-Mesh™ 60</i>	1997			13.03	86.14
30	<i>Terra-Control®</i>	1996			13.15	72.32
31	<i>Geogro</i>	1996			13.39	73.25
32	<i>POZ-O-CAP®</i>	1996			13.44	69.81
33	<i>Conwed 3000 BFM</i>	1999			13.68	84.36
34	<i>Grass Mat</i>	1999			14.53	73.84
35	<i>Geogro</i>	1997			15.35	71.48
36	<i>Greenstreak® PEC-MAT™</i>	1991			16.40	60.04
37	<i>CONTROL</i>	91-99			27.21	43.26

Sediment Loss is expressed as “kilograms per 10 square meters:

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

Flexible Channel Liner Applications  
Record of Product Evaluations

CLASS 2 "FLEXIBLE CHANNEL LINER" APPLICATIONS									
1991	Channel Construction Not Completed								
1992	Channel Construction Not Completed								
1993	Channels Completed but Cycled Canceled due to Weather Damage to Facility								
1994	Began shear stress flows immediately after installation. No channel was able to produce vegetation and all channels exhibited significant and unacceptable sediment loss. Evaluation protocol was revised to provide a 90-day resting period between installation and initial shear stress flows. New evaluation protocol scheduled to begin during 1995 evaluation cycle.								
Year	Chnl	Product Evaluated	Shear Stress Level Flows (Pascals/Lb Sq Ft)						
			96/2	114/3	192/4	239/5	287/6	335/7	383/8
1995	1	Miramat® TM8™	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	2	North American Green C350™ Three Phase	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	3	Landlok® TRM450	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	4	Enkamat® 7020	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	5	Greenstreak® PEC-MAT™	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	6	Tensar® Erosion Mat TM3000	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	7	Geojute® Plus-Regular High Velocity	XXX	XXX	XXX				
	8	CONTROL	XXX	XXX	XXX				
	9	Permamat 200F	XXX	XXX	XXX	XXX			
	10	Curlex® II (Double Sided)	XXX	XXX					
Total Products Evaluated:			10	10	9	7	6	6	6
1996	1	verdyol® Excelsior High Velocity	XXX	XXX	XXX	XXX	XXX		
	2	Enkamat® 7018	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	3	Earth-Lock	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	4	Landlok® BonTerra® SFB12™	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	5	Tensar® Erosion Blanket TB1000	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	6	Pyramat®	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	7	Curlex® I	XXX	XXX	XXX				
	8	CONTROL	XXX	XXX	XXX				
	9	North American Green S150	XXX	XXX	XXX				
	10	KoirMat™ 740	XXX	XXX	XXX				
Total Products Evaluated:			10	10	10	6	6	5	5
1997	1	Pyramat®	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	2	BioD-Mat™ 90	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	3	Koirmat™ 700	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	4	Miramat® TM8™	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	5	Landlok® BonTerra® SFB™	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	6	Earth-Lock	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	7	ECS High Impact Excelsior	XXX	XXX	XXX				
	8	CONTROL	XXX	XXX	XXX				
	9	BonTerra® C2	XXX	XXX	XXX				
	10	Curlex® Channel Enforcer I	XXX	XXX	XXX				
Total Products Evaluated:			10	10	10	6	6	6	6

Flexible Channel Liner Applications  
Record of Product Evaluations

CLASS 2 “FLEXIBLE CHANNEL LINER” APPLICATIONS									
Year	Chnl	Product Evaluated	Shear Stress Level Flows (Pascals/Lb Sq Ft)						
			96/2	114/3	192/4	239/5	287/6	335/7	383/8
1998	1	<i>Landlok® TRM 435</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	2	<i>Greenstreak Pec-Mat</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	3	<i>Curlex Channel Enforcer II</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	4	<i>Permamat 150F</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	5	<i>North American Green P350</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	6	<i>BonTerra CP2</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	7	<i>BonTerra ENC2</i>	XXX	XXX	XXX	XXX			
	8	<i>CONTROL</i>	XXX	XXX	XXX	XXX			
	9	<i>ECS High Velocity Straw Mat</i>	XXX	XXX	XXX	XXX			
	10	<i>Grass Mat</i>	XXX	XXX	XXX	XXX			
Total Products Evaluated:			10	10	10	10	6	6	6
1999	1	<i>Earth-Lock II</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	2	<i>Landlok TRM 1050</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	3	<i>Greenfix CFO72RP</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	4	<i>BonTerra C2</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	5	<i>Enkamat Composite 30</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	6	<i>Multimat 100</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	7	<i>North American Green SC150 BN</i>	XXX	XXX	XXX	XXX			
	8	<i>CONTROL</i>	XXX	XXX	XXX	XXX			
	9	<i>North American Green C125 BN</i>	XXX	XXX	XXX	XXX			
	10	<i>ECS Standard Excelsior</i>	XXX	XXX	XXX	XXX			
Total Products Evaluated:			10	10	10	10	6	6	6
2000	1	<i>North American Green® S350</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	2	<i>Enviromat</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	3	<i>Landlok TRM 1060</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	4	<i>Curlex® III Stitched</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	5	<i>Enkamat Composite NPK</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	6	<i>Xcel PP5</i>	XXX	XXX	XXX	XXX	XXX	XXX	XXX
	7	<i>Greenfix CFO72RR</i>	XXX	XXX	XXX				
	8	<i>CONTROL</i>	XXX	XXX	XXX				
	9	<i>Spraymat</i>	XXX	XXX	XXX				
	10	<i>Curlex® II Stitched</i>	XXX	XXX	XXX				
Total Products Evaluated:			10	10	10	6	6	6	6

Channels 1 through 6 are 7% centerline gradient channels.  
Channels 7 through 10 are 3% centerline gradient channels.

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

**SHEAR STRESS RANGE = 0 - 96 PASCAL (0 - 2 LBS / SQ FT)**

<b>PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
2000	1	<i>North American Green S350™</i>	0.62	86.78
	2	<i>Xcel PP-5</i>	0.73	79.95
	3	<i>Greenfix CFO 72RR</i>	0.74	81.21
	4	<i>Landlok TRM 1060</i>	0.75	82.90
	5	<i>Curlex® III Stitched</i>	0.79	78.52
	6	<i>Curlex® II Stitched</i>	0.81	81.54
	7	<i>Enkamat NPK</i>	0.85	79.82
	8	<i>Enviromat</i>	0.88	78.64
	9	<i>SprayMat</i>	1.07	48.39
<b>PRODUCT PERFORMANCE - 1995 THROUGH 2000 EVALUATION CYCLES</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
1995	1	<i>North American Green C350™ Three Phase™</i>	0.35	79.98
1996	2	<i>KoirMat™ 740</i>	0.42	65.64
1996	3	<i>Earth-Lock</i>	0.49	69.88
1995	4	<i>Geojute®Plus-Regular High Velocity</i>	0.50	59.49
1996	5	<i>Landlok® BonTerra® SFB12™</i>	0.50	72.63
1997	6	<i>Curlex® Channel Enforcer I</i>	0.53	73.70
1997	7	<i>ECS High Impact Excelsior</i>	0.56	82.44
1995	8	<i>Landlok® TRM 450</i>	0.56	78.12
1995	9	<i>Tensar® Erosion Mat TM3000</i>	0.57	92.85
2000	11	<i>North American Green S350</i>	0.62	86.78
1998	12	<i>Landlok® BonTerra® CP2</i>	0.64	78.98
1997	13	<i>Earth-Lock</i>	0.65	76.70
1997	14	<i>Landlok® BonTerra® SFB™</i>	0.67	78.79
1995	15	<i>Miramat® TM8™</i>	0.68	86.57
1996	16	<i>North American Green S150</i>	0.71	82.83
1997	17	<i>Koirmat™ 700</i>	0.72	72.49
1997	18	<i>Landlok® BonTerra® C2</i>	0.72	75.77
1996	19	<i>Tensar® Erosion Blanket TB1000</i>	0.72	73.10
2000	20	<i>Xcel PP5</i>	0.73	79.95
2000	21	<i>Greenfix CFO 72RR</i>	0.74	81.21
2000	22	<i>Landlok TRM 1060</i>	0.75	82.90
1996	23	<i>verdyl® Excelsior High Velocity</i>	0.78	68.84
1995	24	<i>Curlex®II (Double Sided)</i>	0.79	54.66
1998	25	<i>North American Green® P350</i>	0.79	80.85
2000	26	<i>Curlex III® Stitched</i>	0.79	78.52
2000	27	<i>Curlex II® Stitched</i>	0.81	81.54
1996	28	<i>Enkamat® 7018</i>	0.83	79.84
1999	29	<i>North American Green SC150 BN</i>	0.84	84.59
2000	30	<i>Enkamat Composite NPK</i>	0.85	79.82

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE – 1995 THRU 2000 EVALUATION CYCLE				
Cycle	No.	Product Name	Average Sediment Loss	Final Vegetation Density
1995	31	<i>Greenstreak® PEC-MAT™</i>	0.86	71.83
1996	32	<i>Pyramat®</i>	0.87	67.16
1998	33	<i>Grass Mat</i>	0.87	66.66
2000	34	<i>Enviromat</i>	0.88	78.64
1998	35	<i>ECS High Velocity Straw Mat</i>	0.90	82.55
1999	36	<i>Greenfix CFO72RP</i>	0.90	74.29
1999	37	<i>Earth-Lock II</i>	0.91	71.97
1998	38	<i>Landlok™ TRM 435</i>	0.92	72.11
1999	39	<i>North American Green C125 BN</i>	0.95	76.88
1999	40	<i>Multimat 100</i>	0.95	71.72
1995	41	<i>Enkamat® 7020</i>	0.97	82.39
1997	42	<i>Pyramat®</i>	0.98	72.14
1998	43	<i>Landlok® BonTerra® EcoNet™ ENC2</i>	1.00	89.50
1999	44	<i>Landlok BonTerra C2</i>	1.01	63.41
2000	45	<i>Spraymat</i>	1.07	48.39
1999	46	<i>Landlok TRM 1050</i>	1.08	83.67
1999	47	<i>Enkamat Composite 30</i>	1.10	71.20
1999	48	<i>ECS Standard Excelsior</i>	1.10	81.37
1998	49	<i>Curlex® Channel Enforcer II</i>	1.01	82.65
1998	50	<i>Permamat 150F</i>	1.04	68.02
1997	51	<i>Miramat® TM8™</i>	1.07	67.37
1997	52	<i>BioD-Mat™ 90</i>	1.13	63.11
1995	53	<i>Permamat 200F</i>	1.25	56.95
95-00	54	<i>CONTROL</i>	2.00	47.79
1996	55	<i>Curlex® I</i>	2.30	69.98

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

**SHEAR STRESS RANGE = 0 - 192 PASCAL FLOWS (0 - 4 LBS / SQ FT)**

<b>PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
2000	1	<i>Landlok TRM 1060</i>	071	84.59
	2	<i>Greenfix CFO72RR</i>	0.74	81.21
	3	<i>Curlex® II Stitched</i>	0.79	81.54
	4	<i>Enviromat</i>	0.84	78.64
	5	<i>Xcel PP5</i>	0.84	79.95
	6	<i>North American Green S350</i>	0.85	86.78
	7	<i>Curlex® III Stitched</i>	0.85	78.52
	8	<i>Enkamat Composite NPK</i>	0.90	79.82
	9	<i>Spraymat</i>	1.05	48.39
<b>PRODUCT PERFORMANCE - 1995 THROUGH 2000 EVALUATION CYCLES</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
1995	1	<i>North American Green C350™ Three Phase™</i>	0.46	79.98
1996	2	<i>Landlok® BonTerra® SFB12™</i>	0.52	72.63
1996	3	<i>Earth-Lock</i>	0.52	69.88
1996	4	<i>KoirMat™ 740</i>	0.57	65.64
1997	5	<i>Curlex® Channel Enforcer I</i>	0.58	73.70
1995	6	<i>Tensar® Erosion Mat TM3000</i>	0.58	92.85
1995	7	<i>Geojute®Plus-Regular High Velocity</i>	0.61	59.49
1996	8	<i>Earth-Lock</i>	0.65	76.70
1996	9	<i>Tensar® Erosion Blanket TB1000</i>	0.66	73.10
1996	10	<i>Enkamat® 7018</i>	0.66	79.83
2000	11	<i>Landlok TRM 1060</i>	0.71	84.59
1997	12	<i>ECS High Impact Excelsior</i>	0.71	82.44
2000	13	<i>Greenfix CFO72RR</i>	0.74	81.21
1996	14	<i>erdyol® Excelsior High Velocity</i>	0.74	68.84
1997	15	<i>Koirmat™ 700</i>	0.75	72.49
1995	16	<i>Landlok® TRM 450</i>	0.76	78.12
1995	17	<i>Greenstreak® PEC-MAT™</i>	0.76	71.83
2000	18	<i>Curlex® II Stitched</i>	0.79	81.54
1995	19	<i>Miramat® TM8™</i>	0.79	86.57
1997	20	<i>Landlok® BonTerra® C2</i>	0.80	75.77
1999	21	<i>North American Green SC150 BN</i>	0.80	84.59
1998	22	<i>North American Green® P350</i>	0.82	80.85
2000	23	<i>Enviromat</i>	0.84	78.64
2000	24	<i>Xcel PP5</i>	0.84	79.95
1996	25	<i>Pyramat®</i>	0.84	67.16
1998	26	<i>BonTerra® CP2</i>	0.85	78.98
2000	27	<i>North American Green S350</i>	0.85	86.78
2000	28	<i>Curlex® III Stitched</i>	0.85	78.52
1999	29	<i>Landlok TRM 1050</i>	0.85	83.67
1999	30	<i>Earth-Lock II</i>	0.86	71.97
1998	31	<i>ECS High Velocity Straw Mat</i>	0.86	82.55

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

PRODUCT PERFORMANCE - 1991 THROUGH 2000 EVALUATION CYCLES				
Cycle	No.	Product Name	Average Sediment Loss	Final Vegetative Density
1999	32	Enkamat Composite 30	0.86	71.20
1996	33	North American Green S150	0.87	82.83
1997	34	Miramat® TM8™	0.87	67.37
1999	35	Multimat 100	0.87	71.72
1997	36	Pyramat®	0.88	72.14
2000	37	Enkamat Composite NPK	0.90	79.82
1997	38	Landlok® BonTerra® SFB™	0.90	78.79
1998	39	Landlok® BonTerra® EcoNet™ ENC2	0.92	89.50
1999	40	North American Green C125 BN	0.92	76.88
1997	41	BioD-Mat™ 90	0.93	63.11
1999	42	ECS Standard Excelsior	0.94	81.37
1999	43	Greenfix CFO72RP	0.94	74.29
1998	44	Curlex® Channel Enforcer II	0.95	82.65
1998	45	Landlok® TRM 435	0.97	72.11
1999	46	Landlok BonTerra C2	0.97	63.41
1998	47	Permamat 150F	0.98	68.02
2000	48	Spraymat	1.05	48.39
1995	49	Permamat 200F	1.08	56.95
1995	50	Enkamat® 7020	1.09	82.39
1995	51	Curlex®II (Double Sided)	2.51	54.66
1996	52	Curlex® I	2.51	69.98
95-00	53	CONTROL	3.97	47.79

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

**SHEAR STRESS RANGE = 0 - 287 PASCAL FLOWS (0 - 6 LBS / SQ FT)**

<b>PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
2000	1	<i>Landlok TRM 1060</i>	0.69	82.91
	2	<i>Enkamat Composite NPK</i>	0.80	79.82
	3	<i>Curlex® III Stitched</i>	0.83	78.52
	4	<i>North American Green S350</i>	0.87	86.78
	5	<i>Xcel PP5</i>	1.01	79.95
	6	<i>Enviromat</i>	1.04	78.64
<b>PRODUCT PERFORMANCE - 1995 THROUGH 2000 EVALUATION CYCLES</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
1996	1	<i>Landlok® BonTerra® SFB12™</i>	0.53	72.63
1996	2	<i>Earth-Lock</i>	0.55	69.88
1995	3	<i>Tensar® Erosion Mat TM3000</i>	0.59	92.85
1995	4	<i>North American Green C350™ Three Phase™</i>	0.62	82.83
1996	5	<i>Enkamat® 7018</i>	0.66	79.84
2000	6	<i>Landlok TRM 1060</i>	0.69	82.91
1996	7	<i>Tensar® Erosion Blanket TB1000</i>	0.75	73.10
1995	8	<i>Landlok® TRM 450</i>	0.75	78.12
1998	9	<i>Landlok® BonTerra® CP2</i>	0.77	78.98
2000	10	<i>Enkamat Composite NPK</i>	0.80	79.82
1998	11	<i>North American Green® P350</i>	0.80	80.85
1998	12	<i>Landlok™ TRM 435</i>	0.81	72.11
2000	13	<i>Curlex® III Stitched</i>	0.83	78.52
1995	14	<i>Greenstreak® PEC-MAT™</i>	0.83	71.83
1997	15	<i>Koirmat™ 700</i>	0.84	72.49
1996	16	<i>Pyramat®</i>	0.86	67.16
2000	17	<i>North American Green S350</i>	0.87	86.78
1997	18	<i>Earth-Lock</i>	0.88	76.70
1999	19	<i>Greenfix CFO72RP</i>	0.88	74.29
1997	20	<i>Pyramat®</i>	0.89	72.14
1999	21	<i>Landlok TRM 1050</i>	0.89	83.67
1999	22	<i>Earth-Lock II</i>	0.90	71.97
1998	23	<i>Permamat 150F</i>	0.91	68.02
1999	24	<i>Enkamat Composite 30</i>	0.92	71.20
1997	25	<i>Landlok® BonTerra® SFB™</i>	0.93	78.79
1998	26	<i>Curlex® Channel Enforcer II</i>	0.97	82.65
1997	27	<i>Miramat® TM8™</i>	1.00	67.37
2000	28	<i>Xcel PP5</i>	1.01	79.95
1995	29	<i>Miramat® TM8™</i>	1.02	86.57
1999	30	<i>Landlok BonTerra C2</i>	1.03	63.41
2000	31	<i>Enviromat</i>	1.04	78.64
1996	32	<i>Verdyol® Excelsior High Velocity</i>	1.07	68.84
1995	33	<i>Permamat 200F</i>	1.10	56.95
1999	34	<i>Multimat 100</i>	1.10	71.72

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round



Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

<b>PRODUCT PERFORMANCE - 1995 THROUGH 2000 EVALUATION CYCLES</b>				
Cycle	No.	<i>Product Name</i>	Average Sediment Loss	Final Vegetative Density
1997	35	<i>BioD-Mat™ 90</i>	1.11	63.11
1995	36	<i>Enkamat® 7020</i>	1.28	82.39
95-00	37	<i>CONTROL</i>	Not Tested	47.79

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

**SHEAR STRESS RANGE = 0 - 383 PASCAL FLOWS (0 - 8 LBS / SQ FT)**

<b>PRODUCT PERFORMANCE 2000 EVALUATION CYCLE ONLY</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
2000	1	<i>Landlok TRM 1060</i>	0.70	82.91
	2	<i>Curlex® III Stitched</i>	0.78	78.52
	3	<i>North American Green S350</i>	0.78	86.78
	4	<i>Enkamat Composite NPK</i>	0.81	79.82
	5	<i>Enviromat</i>	0.94	78.64
	6	<i>Xcel PP5</i>	1.00	79.95
<b>PRODUCT PERFORMANCE - 1995 THROUGH 2000 EVALUATION CYCLES</b>				
Cycle	No	Product Name	Average Sediment Loss	Final Vegetative Density
1996	1	<i>Landlok® BonTerra® SFB12™</i>	0.59	72.63
1995	2	<i>Tensar® Erosion Mat TM3000</i>	0.59	92.85
1995	3	<i>North American Green C350™ Three Phase™</i>	0.63	79.98
1996	4	<i>Earth-Lock</i>	0.67	69.88
1995	5	<i>Landlok® TRM 450</i>	0.69	78.12
2000	6	<i>Landlok TRM 1060</i>	0.70	82.91
1998	7	<i>Landlok® TRM 435</i>	0.71	72.11
1999	8	<i>Landlok TRM 1050</i>	0.75	83.67
1996	9	<i>Tensar® Erosion Blanket TB1000</i>	0.76	73.10
1998	10	<i>North American Green® P350</i>	0.77	80.85
1996	11	<i>Pyramat®</i>	0.77	67.16
1997	12	<i>Pyramat®</i>	0.78	72.14
2000	13	<i>Curlex® III Stitched</i>	0.78	78.52
2000	14	<i>North American Green S350</i>	0.78	86.78
2000	15	<i>Enkamat Composite NPK</i>	0.81	79.82
1999	16	<i>Greenfix CFO72RP</i>	0.83	74.29
1998	17	<i>Permamat 150F</i>	0.84	68.02
1998	18	<i>Landlok® BonTerra® CP2</i>	0.84	78.98
1999	19	<i>Earth-Lock II</i>	0.84	71.97
1997	20	<i>Earth-Lock</i>	0.86	76.70
1998	21	<i>Greenstreak® PEC-MAT®</i>	0.88	70.85
1998	22	<i>Curlex® Channel Enforcer II</i>	0.90	82.65
1999	23	<i>Enkamat Composite 30</i>	0.91	71.20
1997	24	<i>Koirmat™ 700</i>	0.93	72.49
2000	25	<i>Enviromat</i>	0.94	78.64
2000	26	<i>Xcel PP5</i>	1.00	79.95
1995	27	<i>Greenstreak® PEC-MAT™</i>	1.00	71.83
1997	28	<i>Landlok® BonTerra® SFB™</i>	1.03	78.79
1999	29	<i>Landlok BonTerra C2</i>	1.04	63.41
1995	30	<i>Miramat® TM8™</i>	1.06	86.57
1996	31	<i>Verdyol® Excelsior High Velocity</i>	1.08	68.84
1999	32	<i>Multimat 100</i>	1.08	71.72
1997	33	<i>Miramat® TM8™</i>	1.09	67.37
1996	34	<i>Enkamat® 7018</i>	1.10	79.84

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Flexible Channel Liner Applications  
Final Performance Analysis, 1995 - 2001 Evaluation Cycles

<b>PRODUCT PERFORMANCE - 1995 THROUGH 2000 EVALUATION CYCLES</b>				
Cycle	No.	<i>Product Name</i>	Average Sediment Loss	Final Vegetative Density
1997	35	<i>BioD-Mat™ 90</i>	1.15	63.11
1995	36	<i>Enkamat® 7020</i>	1.33	82.39
95-00	37	<i>CONTROL</i>	Not Tested	47.79

Notes: Average Sediment Loss = Average Soil Movement expressed in Centimeters;  
Final Vegetative Density = Percent Vegetative Cover Achieved by Final Measurement Round

Cellulose Fiber Mulch  
Record of Product Evaluations

Year	No	Product Evaluated	1:3 Clay	1:3 Sand
1991	No Cellulose Fiber Mulch Evaluations Performed			
1992	1	<i>American Fiber Mulch</i>	XXX	XXX
	2	<i>Conwed® Hydro Mulch®</i>	XXX	XXX
	3	<i>Second Nature® Regenerated Paper Fiber</i>	XXX	XXX
	<b>Total Products Evaluated:</b>		<b>3</b>	<b>3</b>
1993	Evaluation Cycle Canceled Due to Weather Damage			
1994	1	<i>American Fiber Mulch (with Hydro-Stik)</i>	XXX	
	2	<i>American Fiber Mulch (with Fiber Plus)</i>		XXX
	3	<i>Pro Mat®</i>	XXX	XXX
	4	<i>Pro Mat® XL</i>	XXX	XXX
	5	<i>Pro Mat® (with RMBplus)</i>	XXX	XXX
	6	<i>Silva-Fiber Plus®</i>	XXX	XXX
1995	1	<i>Second Nature® Regenerated Paper Fiber</i>	XXX	Destroyed*
	2	<i>Excel Fibermulch® II</i>	XXX	Destroyed*
	<b>Total Products Evaluated:</b>		<b>7</b>	<b>7</b>
	* Products destroyed by natural rainfall soon after installation. Products reinstalled but were subsequently destroyed by another natural rainfall. Products were not reinstalled.			
1996	1	<i>Enviro-Gro</i>	XXX	XXX
	2	<i>Excel Fibermulch® II</i>		XXX
	3	<i>Second Nature® Regenerated Paper Fiber</i>		XXX
	<b>Total Products Evaluated:</b>		<b>1</b>	<b>3</b>
1997	1	<i>American Fiber Mulch</i>	XXX	XXX
	2	<i>American Fiber Mulch with Stick Plus</i>		XXX
	3	<i>Conwed® Hydro Mulch®</i>		XXX
	4	<i>Excel Fibermulch® II</i>		XXX
	5	<i>Pro Mat®</i>		XXX
	6	<i>Pro Mat® (with RMBplus)</i>		XXX
	7	<i>Pro Mat® XL</i>		XXX
	<b>Total Products Evaluated:</b>		<b>1</b>	<b>7</b>
1998	1	<i>Evercycle™ Hydro-Mulch</i>	XXX	XXX
	2	<i>Lay-Low Mulch</i>	XXX	XXX
	3	<i>Pennzsuppress®</i>	XXX	XXX
	<b>Total Products Evaluated:</b>		<b>3</b>	<b>3</b>
1999	1	<i>Agri-Fiber</i>	XXX	XXX
	2	<i>Oasis Fiber Mulch</i>	XXX	XXX
	<b>Total Products Evaluated:</b>		<b>2</b>	<b>2</b>
2000	Cycle was lost due to weather			
	<b>Total Products Evaluated:</b>		<b>0</b>	<b>0</b>

Cellulose Fiber Mulch  
Final Performance Analysis, 1992 - 2001 Evaluation Cycles

**Final Vegetative Density**

PRODUCT PERFORMANCE - 2000 EVALUATION CYCLE ONLY					
No	Product Name	Year	Slope	Soil	Vegetation Density
1	Entire cycle was lost due to slope failure from inclement weather				
2					
PRODUCT PERFORMANCE - 1992 THROUGH 2000 EVALUATION CYCLES					
No	Product Name	Year	Slope	Soil	Vegetation Density
1	Excel Fibermulch® II	1995	1:3	Clay	96.33
2	Second Nature® Regenerated Paper Fiber	1995			95.08
3	Silva-Fiber Plus®	1994			91.98
4	Pro Mat® XL	1994			86.25
5	Evercycle™ Hydro-Mulch	1998			84.33
6	Pro Mat®	1994			84.15
7	American Fiber Mulch (with Fiber Plus)	1994			82.53
8	Pro Mat® (with RMBplus)	1994			82.96
9	American Fiber Mulch	1997			82.53
10	Conwed® Hydro Mulch®	1992			82.17
11	Pennzsuppress®	1998			81.91
12	Lay-Low Mulch	1998			81.34
13	Oasis Fiber Mulch	1999			80.50
14	Enviro-Gro	1996			79.53
15	Second Nature® Regenerated Paper Fiber	1992			77.97
16	Agri-Fiber	1999			73.50
17	American Fiber Mulch	1992			66.61
18	CONTROL	92-99			57.78

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

Cellulose Fiber Mulch  
Final Performance Analysis, 1992 - 2001 Evaluation Cycles

**Final Vegetative Density**

PRODUCT PERFORMANCE - 2000EVALUATION CYCLE ONLY					
No	Product Name	Year	Slope	Soil	Vegetation Density
1	Entire cycle was lost due to slope failure from inclement weather				
2					
PRODUCT PERFORMANCE - 1992 THROUGH 2000 EVALUATION CYCLES					
No	Product Name	Year	Slope	Soil	Vegetation Density
1	Pro Mat® (with RMBplus)	1997	1:3	Sand	90.04
2	Pennzsuppress®	1998			89.60
3	Conwed® Hydro Mulch®	1997			86.75
4	American Fiber Mulch	1997			85.56
5	Pro Mat® XL	1997			85.29
6	Pro Mat®	1997			81.97
7	American Fiber Mulch (with Fiber Plus)	1997			81.25
8	Excel Fibermulch® II	1997			79.02
9	Oasis Fiber Mulch	1999			71.14
10	Lay-Low Mulch	1998			76.47
11	Enviro-Gro	1996			68.72
12	Second Nature® Regenerated Paper Fiber	1996			65.19
13	Evercycle™ Hydro-Mulch	1998			64.66
14	Agri-Fiber	1999			55.13
15	Excel Fibermulch® II	1996			54.37
16	CONTROL	92-99			47.60
17	American Fiber Mulch	1992			40.99
18	Second Nature® Regenerated Paper Fiber	1992			40.27
19	Conwed® Hydro Mulch®	1992			31.55
20	Pro Mat®	1994			25.07
21	Silva-Fiber Plus®	1994			24.83
22	Pro Mat® XL	1994			24.62
23	Pro Mat® (with RMBplus)	1994			23.05
24	American Fiber Mulch (with Hydro-Stik)	1994			22.52

Vegetation Density is expressed as the “average percent of vegetative cover at the final measurement round”

**MINIMUM PERFORMANCE STANDARDS**  
**Texas Department of Transportation**

Effective Date: March 1, 1997

Specification Pay Item	Class	Type	Site Conditions	Maximum Sediment Loss	Minimum Vegetation Density
169 “Soil Retention Blanket”	1 “Slope Protection”	A	Slopes 1:3 or Flatter - Clay Soil	0.34	80%
		B	Slopes 1:3 or Flatter - Sand Soil	12.20	70%
		C	Slopes Steeper than 1:3 - Clay Soil	0.34	80%
		D	Slopes Steeper than 1:3 - Sand Soil	26.84	70%
169 “Soil Retention Blanket”	2 “Flexible Channel Liner”	E	Shear Stress Range 0 - 96 Pa	1.15	70%
		F	Shear Stress Range 0 - 192 Pa	1.00	70%
		G	Shear Stress Range 0 - 287 Pa	1.00	70%
		H	Shear Stress Range 0 - 383 Pa	0.80	70%
164 “Seeding for Erosion Control”	“Cellulose Fiber Mulch”	N/A	Clay or Tight Soil	N/A	70%
		N/A	Sand or Loose Soil	N/A	60%

In order for a Soil Retention Blanket or Cellulose Fiber Mulch to be placed upon TxDOT’s official Approved Product List (APL), and be eligible for use within TxDOT’s construction and/or maintenance activities, the product must meet or exceed the above performance standards through formal testing at the TxDOT/TTI Hydraulics and Erosion Control Laboratory located on the Riverside Campus of Texas A&M University, College Station, Texas.

TxDOT reserves the right to revise any of the above performance standards based upon a statistical review of the performance data, as received from a completed evaluation cycle at the TxDOT/TTI Hydraulics and Erosion Control Laboratory.

Complete product performance data and TxDOT’s current Approved Product List (APL) may be viewed on TxDOT’s Internet home page by pointing your browser to <http://www.dot.state.tx.us>, clicking on “Business” button, then clicking on the “Material Information” button, then clicking on “Field Performance of Erosion Control Products.”

Printed copies of the latest final performance report and the APL are also available through John Mason, Texas Department of Transportation, Maintenance Division, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, telephone (512)416-3081, fax (512)416-3044, e-Mail [jmason@dot.state.tx.us](mailto:jmason@dot.state.tx.us).

Maximum Sediment Loss - Class 1 = “Kilograms of Sediment per 10 Square Meters”  
Maximum Sediment Loss - Class 2 = “Centimeters of Soil Displacement within Shear Stress Flow Range”  
Minimum Vegetative Density = “Average Percentage of Vegetative Cover at Final Measurement Round”

APPROVED PRODUCT LIST  
ITEM 169 “SOIL RETENTION BLANKET”

Effective October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT’s Web Page at <http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 1 “SLOPE PROTECTION”**

**Type A - Slopes 1:3 or Flatter - Clay Soils:**

Airtrol	Landlok BonTerra EcoNet™ ENCS2
Anti-wash/Geojute	Landlok BonTerra S1
BioD-Mesh 60	Landlok BonTerra S2
Carthage Mills Veg Net	Landlok BonTerra CS2
C-Jute	Landlok BonTerra SFB12
Contech Standard	Landlok 407GT
Contech Standard Plus	Landlok FRS 3112
Contech Straw/Coconut Fiber Mat w/Kraft Net	Landlok TRM 435
Contech C-35	Miramat TM8
Conwed 3000	North American Green S150
Curlex I	North American Green S75
Curlex™-LT	North American Green® S75 BN
Earth Bound	North American Green SC150
EcoAegis™	North American Green® S150 BN
Econo-Jute	Maccaferri MX287
ECS Excelsior Blanket Standard	Pennzsuppress®
ECS High Velocity Straw Mat	Poplar Erosion Blanket
ECS Standard Straw	Soil Guard
EnviroGuard Plus	Soil Saver
Formula 480 Liquid Clay	SuperGro
Futerra®	Terra-Control®
Grass Mat	TerraJute
Greenfix WSO72	verdyol Ero-Mat
GeoTech TechMat™ SCKN	verdyol Excelsior High Velocity
Green Triangle Regular	verdyol Excelsior Standard
Green Triangle Superior	Webtec Terraguard 44P
Greenstreak Pec-Mat	Xcel Regular
Landlok BonTerra EcoNet™ ENS2	Xcel Superior



APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

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**CLASS 1 "SLOPE PROTECTION"** (continued)

Type B - 1:3 or Flatter - Sandy Soils:

C-Jute	Landlok® BonTerra®EcoNet™ENCs2™
Carthage Mills Veg Net	Landlok® BonTerra®EcoNet™ ENS2
Contech Standard	Landlok FRS 3112
Contech Standard Plus	Landlok 407GT
Contech Straw/Coconut Fiber Mat w/Kraft Net	Landlok TRM 435
Contech C-35	Maccaferri MX287
Curlex LT	Miramat 1000
Earth Bound	Miramat TM8
ECS Standard Straw	North American Green S75
ECS Excelsior Blanket Standard	North American Green® S75 BN
ECS High Velocity Straw Mat	North American Green S150
EcoAegis™	North American Green SC150
EnviroGuard Plus	North American Green® S150 BN
Futerra®	Poplar Erosion Blanket
Greenfix WSO72	Soil Guard
Geojute Plus 1	Terra-Control®
GeoTech TechMat™ SCKN	TerraJute
Green Triangle Regular	verdyol Ero-Mat
Green Triangle Superior	verdyol Excelsior Standard
Landlok® BonTerra S1	Webtec Terraguard 44P
Landlok® BonTerra S2	Xcel Regular
Landlok® BonTerra CS2	Xcel Superior

APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT's Web Page at <http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 1 "SLOPE PROTECTION"** (continued)

Type C - Slopes Steeper than 1:3 - Clay Soils:

Airtrol	Landlok® BonTerra S2
Anti-Wash/Geojute	Landlok BonTerra CS2
Carthage Mills Veg Net	Landlok® BonTerra SFB12
C-Jute	Landlok 407GT
Contech Standard Plus	Landlok FRS 3112
Contech Straw/Coconut Fiber Mat w/Kraft Net	Landlok TRM 435
Contech C-35	Maccaferri MX287
Conwed 3000	Miramat TM8
Curlex I	North American Green S150
Earth Bound	North American Green S75
Econo Jute	North American Green SC150
ECS High Velocity Straw Mat	North American Green® S150 BN
ECS Standard Straw	Pennzsuppress®
EnviroGuard Plus	Poplar Erosion Blanket
Formula 480 Liquid Clay	Soil Guard
Futerra®	Soil Saver
Greenfix WSO72	SuperGro
Green Triangle Superior	TerraJute
GeoTech TechMat™ SCKN	verdyol Excelsior High Velocity
Greenstreak Pec-Mat	Webtec Terraguard 44P
Landlok® BonTerra® EcoNet™ ENCS2	Xcel Superior

APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT's Web Page at <http://www.dot.state.tx.us/insdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 1 "SLOPE PROTECTION"** (continued)

Type D - Slopes Steeper than 1:3 - Sandy Soils:

C-Jute	Landlok® BonTerra CS2
Carghage Mills Veg Net	Landlok® BonTerra®EcoNet™ENCS2™
Contech Standard Plus	Landlok 407GT
Contech Straw/Coconut Fiber Mat w/Kraft Net	Landlok FRS 3112
Contech C-35	Landlok TRM 435
Curlex I	Maccaferri MX287
ECS High Velocity Straw Mat	Miramat 1000
ECS Standard Straw	Miramat TM8
EnviroGuard Plus	North American Green S150
Futerra®	North American Green SC150
Greenfix WSO72	North American Green® S150 BN
Geojute Plus 1	Soil Guard
GeoTech TechMat™ SCKN	TerraJute
Green Triangle Superior	Webtec Terraguard 44P
Landlok® BonTerra S2	Xcel Superior

APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT's Web Page at <http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 2 - "FLEXIBLE CHANNEL LINER"**

Type E - Shear Stress Range 0 - 96 Pascal (0 - 2 Pounds Per Square Foot):

Contech TRM C-45	Koirmat™ 700
Contech C-35	Landlok® BonTerra® C2
Contech C50	Landlok® BonTerra® CP2
Contech Coconut/Poly Fiber Mat	Landlok® BonTerra® EcoNet™ ENC2
Contech Coconut Mat w/Kraft Net	Landlok® BonTerra® SFB™
Curlex® II Stitched	Landlok® BonTerra SFB12
Curlex® III Stitched	Landlok TRM 435
Curlex® Channel Enforcer 1	Landlok TRM 450
Curlex® Channel Enforcer II	Landlok TRM 1050
Earth-Lock	Landlok TRM 1060
Earth-Lock II	Maccaferri MX287
ECS High Impact Excelsior	Miramat TM8
ECS Standard Excelsior	Multimat 100
ECS High Velocity Straw Mat	North American Green C125 BN
Enkamat 7018	North American Green C350 Three Phase
Enkamat 7020	North American Green SC150 BN
Enkamat Composite 30	North American Green S350
Enkamat Composite NPK**	North American Green® P350
Enviromat	North American Green S150
Geotech TechMat™ CP 3-D	Pyramat®
Geotech TechMat™ CKN	Webtec Terraguard 44P
Greenfix CFO 72RP **	Webtec Terraguard 45P
Greenfix CFO 72RR	Xcel PP-5
Greenstreak Pec-Mat	

\*\* According to the manufacturer, this product is no longer being manufactured. The Contractor may utilize this product under this Class and Type only until existing supplies are exhausted.

APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT's Web Page at <http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 2 - "FLEXIBLE CHANNEL LINER"** (continued)

**Type F - Shear Stress Range 0 - 192 Pascal (0 - 4 Pounds Per Square Foot):**

Curlex® II Stitched	Koirmat™ 700
Curlex® III Stitched	Landlok® BonTerra® C2
Curlex® Channel Enforcer 1	Landlok® BonTerra® CP2
Curlex® Channel Enforcer II	Landlok® BonTerra® EcoNet™ ENC2
Contech C50	Landlok BonTerra® SFB™
Contech TRM C-45	Landlok BonTerra SFB12
Contech C-35	Landlok TRM 435
Contech Coconut/Poly Fiber Mat	Landlok TRM 450
Contech Coconut Mat w/Kraft Net	Landlok TRM 1050
Earth-Lock	Landlok TRM 1060
Earth-Lock II	Maccaferri MX287
ECS High Impact Excelsior	Miramat TM8
ECS High Velocity Straw Mat	Multimat 100
ECS Standard Excelsior	North American Green C125 BN
Enkamat 7018	North American Green C350 Three Phase
Enkamat Composite 30	North American Green SC150 BN
Enkamat Composite NPK **	North American Green S350
Enkamat Composite P/T**	North American Green® P350
Enviromat	North American Green S150
Geotech TechMat™ CP 3-D	Pyramat®
Geotech TechMat™ CKN	Webtec Terraguard 44P
Greenfix CFO 72RP **	Webtec Terraguard 45P
Greenfix CFO 72RR	Xcel PP-5
Greenstreak Pec-Mat	

\*\* According to the manufacturer, this product is no longer being manufactured. The Contractor may utilize this product under this Class and Type only until existing supplies are exhausted.

APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT's Web Page at <http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 2 - "FLEXIBLE CHANNEL LINER"** (continued)

**Type G - Shear Stress Range 0 - 287 Pascal (0 - 6 Pounds Per Square Foot):**

Contech TRM C-45	Koirmat™ 700
Contech C-35	Landlok® BonTerra® CP2
Contech C50	Landlok® BonTerra® SFB™
Contech Coconut/Poly Fiber Mat	Landlok® BonTerra SFB12
Curlex® III Stitched	Landlok TRM 1050
Curlex® Channel Enforcer II	Landlok TRM 1060
Earth-Lock	Landlok TRM 435
Earth-Lock II	Landlok TRM 450
Enkamat 7018	North American Green C350 Three Phase
Enkamat Composite 30	North American Green S350
Enkamat Composite NPK**	North American Green® P350
Enkamat Composite P/T **	Pyramat®
Geotech TechMat™ CP 3-D	Webtec Terraguard 44P
Greenfix CFO 72RP **	Webtec Terraguard 45P
Greenstreak Pec-Mat	

\*\* According to the manufacturer, this product is no longer being manufactured. The Contractor may utilize this product under this Class and Type only until existing supplies are exhausted.

APPROVED PRODUCT LIST  
ITEM 169 "SOIL RETENTION BLANKET"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved products in accordance with the Class and Type as specified on the plans. The current Approved Product List may be found on TxDOT's Web Page at <http://www.dot.state.tx.us/insdtdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Maintenance Division, Vegetation Management Section, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CLASS 2 - "FLEXIBLE CHANNEL LINER"** (continued)

Type H - Shear Stress Range 0 - 383 Pascal (0 - 8 Pounds Per Square Foot):

Contech TRM C-45	Landlok TRM 1050
Contech C-35	Landlok TRM 1060
Contech C50	North American Green C350 Three Phase
Contech Coconut/Poly Fiber Mat	North American Green S350
Curlex® III Stitched	North American Green® P350
Geotech TechMat™ CP 3-D	Pyramat®
Landlok® BonTerra SFB12	Webtec Terraguard 44P
Landlok TRM 435	Webtec Terraguard 45P
Landlok TRM 450	

APPROVED PRODUCT LIST  
ITEM 164 "SEEDING FOR EROSION CONTROL"

Effective Date: October 4, 2001

The Contractor has the option of utilizing the following approved cellulose fiber mulches. The current Approved Product List may be found on TxDOT's Web Page by pointing your browser to <http://www.dot.state.tx.us/insdot/orgchart/cmd/erosion/contents.htm>. Direct all questions to John Mason of the Vegetation Management Section, Maintenance Division, 125 E. 11<sup>th</sup> Street, Austin, TX 78701-2483, (512) 416-3081.

**CELLULOSE FIBER MULCHES**

Clay or Tight Soils:

- Agri-Fiber
- American Fiber Mulch
- American Fiber Mulch (with Hydro-Stick)
- Conwed Hydro Mulch
- Enviro-Gro
- Evercycle™ Hydro-Mulch
- Excel Fibermulch II (with Exact-Tac)
- Lay-Low Mulch
- Oasis Fiber Mulch
- Pennzsuppress®
- Pro Mat
- Pro Mat (with RMBplus)
- Pro Mat XL
- Second Nature Regenerated Paper Fiber Mulch
- Silva Fiber Plus

Sandy or Loose Soils:

- American Fiber Mulch
- American Fiber Mulch (with Hydro-Stick)
- American Fiber Mulch with Stick Plus
- Conwed Hydro Mulch
- Enviro-Gro
- Evercycle™ Hydro-Mulch
- Excel Fibermulch II (with Exact-Tac)
- Lay-Low Mulch
- Oasis Fiber Mulch
- Pennzsuppress®
- Pro Mat
- Pro Mat (with RMBplus)
- Pro Mat XL
- Second Nature Regenerated Paper Fiber Mulch